Endura KP915GV

Product Manual

RadiSys.
THE POWER OF WE

www.radisys.com

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Preface

Revision History

Revision history

No.	Date	Description
1.0	September 2005	• First Release
2.0	December 2005	• Updates to clarify jumper default positioning, non-support for S/PDIF In and Out on board, BIOS update to P28 version, and editorial changes to some tables. Added details to OEM Features section. No functional changes.

Notational Conventions

This manual uses the following conventions:

- Screen text and syntax strings appear in this font.
- All numbers are decimal unless otherwise stated.

Notes indicate important information about the product.

Tips indicate alternate techniques or procedures that you can use to save time or better understand the product.

The globe indicates a World Wide Web address.

The book indicates a book or file.

ESD cautions indicate situations that *may* cause damage to hardware via electro-static discharge (ESD).

Cautions indicate potentially hazardous situations which, if not avoided, may result in minor or moderate injury or damage to data or hardware. It may also alert you about unsafe practices.

Warnings indicate potentially hazardous situations which, if not avoided, can result in death or serious injury.

Danger indicates imminently hazardous situations which, if not avoided, will result in death or serious injury.

Installation Notes

When installing this motherboard into a suitable chassis, refer to the following notes:

- Read and save all instructions.
- Always disconnect Cord/Plug before installation or upgrade. Parts of the motherboard can remain powered even when the power supply is switched off unless the cord is disconnected.
- Pay attention to the safety warnings included in this document.
- When installing expansion cards, pay attention to the maximum loads detailed in this document. Use only UL approved peripheral cards.
- Route wiring away from sharp edges, heat sources and cooling fans.
- Pay attention to the thermal issues described in this document. The motherboard requires suitable airflow to maintain an ambient temperature within its operating range.

Safety and Approval Notices

Safety and approval notices

Item	Description
Battery	This product contains a lithium cell. • When removing or replacing the lithium cell, do not use a conductive instrument as a short-circuit may cause the cell to explode. Always replace the cell with one of the same type. This product uses a CR2032 cell. Dispose of a spent cell promptly – do not recharge, disassemble or incinerate. Keep cells away from children. • **CAUTION!** Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of batteries according to the manufacturer's instructions.
LAN (Local Area Network) Connector	This product may include an RJ45 LAN connector (see product options). Do not connect to anything other than an Ethernet LAN.
Thermal Interface Material	This product may contain thermal interface material between devices and heatsinks. This can cause irritation and can stain clothing. Avoid prolonged or repeated contact with the skin and wash thoroughly with soap and water after handling. Avoid contact with eyes and inhalation of fumes. Do not ingest.
Anti-static Precautions	This product contains static-sensitive components and should be handled with care. It is recommended that the product be handled in a Special Handling Area (SHA) as defined in EN100015-1:1992. Such an area has working surfaces, floor coverings and chairs connected to a common earth reference point. An earthed wrist strap should be worn whilst handling. Other examples of static-sensitive devices are the memory modules and the processor. Failure to employ adequate anti-static measures can cause irreparable damage to components on the motherboard.
Electromagnetic Compatibility	This product is designed to meet the following EMC standards when installed in a suitable chassis. • FCC Class B (Title 47 of Code of Federal Regulations, parts 2 & 15, subpart B) • EN55022 Class B • EN55024
Safety	This product complies with the American Safety Standard UL60950 when installed in a suitable chassis.
Legal Directives	This product complies with the relevant clauses of the following European Directives. Low Voltage Directive 73/23/EEC EMC Directive 89/336/EEC

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1 Overview

Target applications are transaction terminals, medical, test & measurement, gaming, industrial automation applications and other enterprise systems. This motherboard is part of the RadiSys Endura product line, which is specifically targeted at embedded applications with a lifetime of 5 years. Products are fully revision controlled and any change to form, fit or function will be notified to customers in advance via a Product Change Notification procedure.

Product Specification Overview

Item	Description
Form Factor	ATX 12” x 9.6”, 6 expansion slots
Processor	Support for an Intel® Pentium® 4 or Celeron D processor in a LGA775 socket with an 800MHz or 533MHz FSB Embedded processor requirements: Intel® Pentium® 4 Processor 551 (3.4GHz 800MHz FSB 1MB L2) Intel® Celeron™ D Processor 341 (2.93GHz 533MHz FSB 256KB L2)
Chipset	Intel 915GV GMCH and Intel ICH6 I/O hub
Memory	Four DIMM sockets for DDR2 400/533 modules
Video	Intel® GMA900 video controller integrated within chipset
Audio	Two channel stereo audio using the Sigmatel STAC9200 audio controller with Intel HD Audio interface operation option Two plug and play jacks on I/O panel (default MIC, line-out) Three ATAPI connectors – line input, line output, and microphone input On-board PC speaker (beep)
Expansion Capabilities	915GV ATX Three PCI, two x1 PCI-E, one ADD2 slots (No PCI riser extension connector)
Power Management	ACPI 2.0 supporting states S0, S3, S4, S5, and C0, C1, C2, C3
System Management	Voltage, temperature and fan monitoring (3 fans) Lithium cell voltage monitoring Automatic fan speed control (3 fans) Programmable watchdog timer SMBus header
Security	Header for TPM 1.1 compliant module
BIOS	Phoenix Award BIOS for the Intel 915G/GV chipset Includes video BIOS and network boot 4Mbit Firmware Hub Build option for socketed BIOS with write-protect jumper (enabled by the PLD logic) User defined BIOS default settings
I/O	Eight USB 2.0 ports - four on I/O panel and four on locking headers General purpose I/O lines (13) with LCD character display support
Firewire	Available with IEEE 1394b function with single port via an on-board header connector (based on TI TSB82AA2 controller and TSB81BA3 transceiver)

Product Specification Overview

Item	Description	
Network	Intel 82573V (or 'L) PCI-E Gbit Ethernet controller, co-lay with Intel 82562GZ 10/100 PHY (using the integrated MAC)	
	Available with second Intel 82573V (or 'L) Gbit Ethernet controller	
Disks	Four SATA ports with locking headers	
	Single Ultra ATA/100 interface supporting hard disks and ATAPI drives	
	One FDD interface	
Super I/O & H/W Monitor	Nat Semiconductor PC8374K Super I/O and Nat Semiconductor LM9600 hardware monitoring device	
	Automatic fan speed control based on thermal monitoring (note that the BIOS Setup is used for configuration and status information)	
Header Connectors	GPIO	2 x 10 pin with housing
	SMbus	1 x 4 pin with housing
	COM2	2 x 5 pin with housing
	Kbd/Mouse	1 x 4 pin with housing
	Remote thermal sensor	1 x 2 pin with housing
	FDD	1 x FDD connector
	1394b	2 x 5 pin connector
I/O Panel	PS/2 keyboard and mouse	
	Analog VGA	
	Bi-directional/EPP/ECP parallel port	
	COM1 RS232	
	One or two dual USB + RJ45 stacks	
	Audio jack stack (2 jacks)	
RadiSys PLD	Lattice LC4128ZC-75TN100C PLD for watchdog, GPIO, BIOS write-protect support	

1.1 Accessories

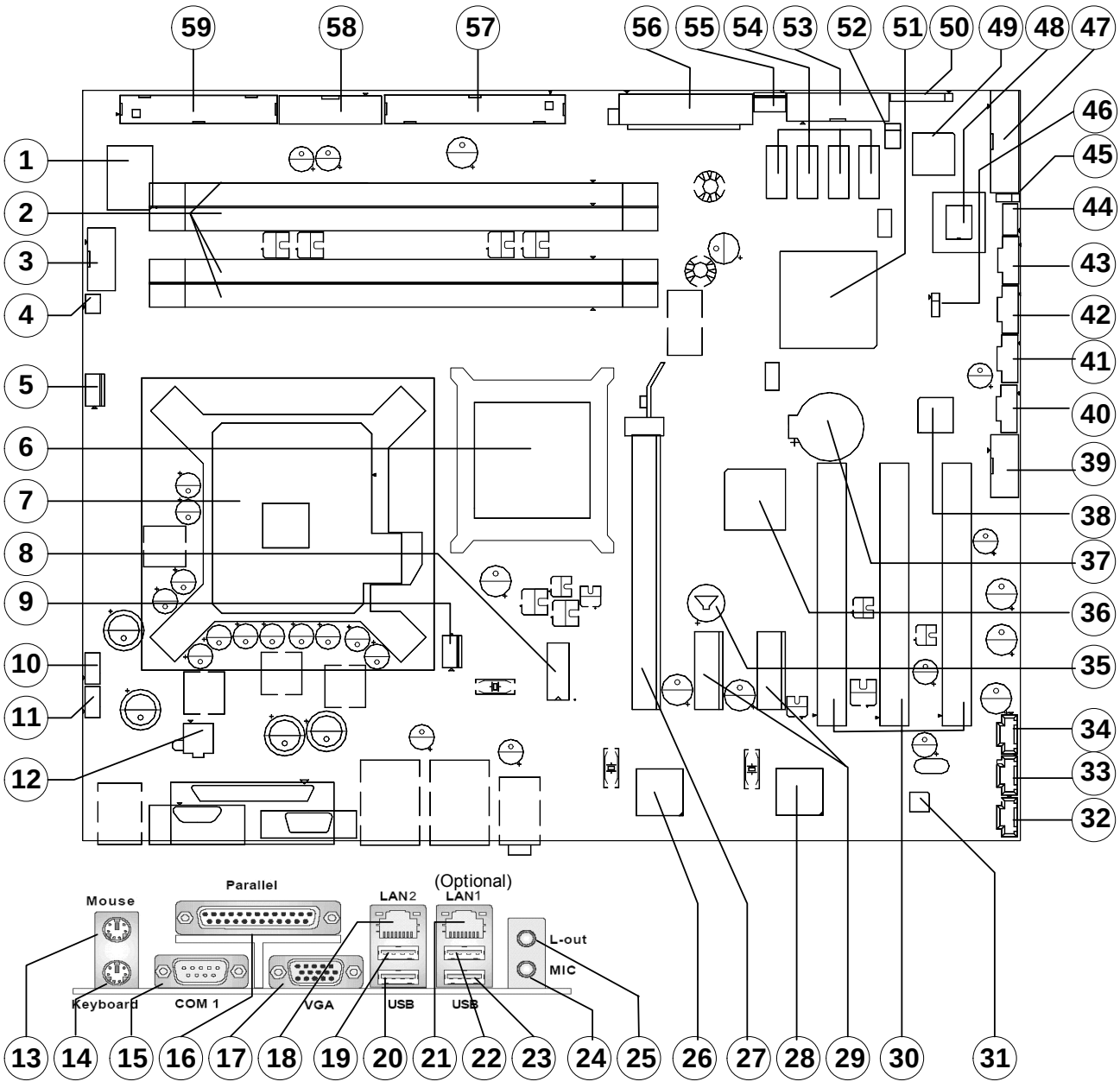
There are two I/O shields, one for the single Ethernet configuration and one for the dual Ethernet configuration, and an available fan heat sink for the processor. These are separately orderable product codes.

ATX-L KP IOSHLD ATX I/O Shield for KP915GV

1.2 Motherboard Layout

Figure 1 shows the layout of the KP915GV motherboard with the major components identified.

Figure 1. KP915GV Board Layout



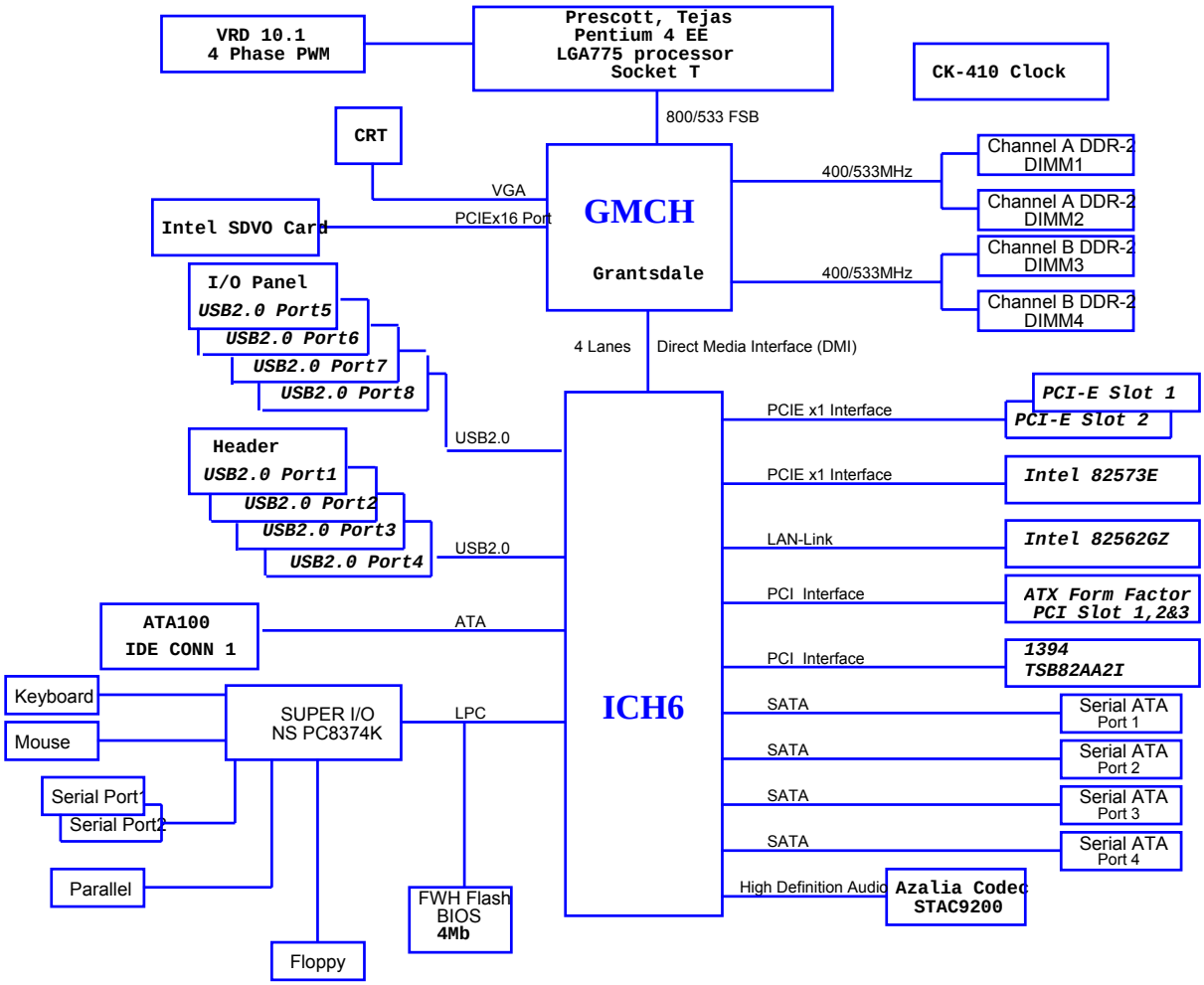
Component Identification

	Description		Description		Description
1	Super IO	**21**	Ethernet port 1 (option)	**41**	USB port 2 header
2	Memory sockets	**22**	I/O panel USB port 7	**42**	USB port 3 header
3	Serial port 2 header	**23**	I/O panel USB port 8	**43**	USB port 4 header
4	Remote thermal sensor	**24**	Microphone input jack	**44**	SMBus header
5	CPU FAN power connector	**25**	Audio line output jack	**45**	BIOS ROM write-protect jumper
6	Chipset GMCH	**26**	Ethernet controller 1 (option)	**46**	Clear CMOS Jumper
7	775-pin socket for processor	**27**	ADD2 slot	**47**	GPIO header
8	Clock generator	**28**	Ethernet controller 2	**48**	BIOS ROM (FWH)
9	System fan power connector	**29**	PCI Express x1 slot	**49**	CPLD control logic
10	PS/2 mouse header	**30**	PCI slot 2.3	**50**	JTAG header
11	PS/2 keyboard header	**31**	HD Audio CODEC	**51**	I/O controller hub (ICH6)
12	12V power connector	**32**	Stereo audio (CD) line input header	**52**	Operation Mode Jumper
13	PS/2 mouse (green)	**33**	Stereo audio (microphone) input header	**53**	Front panel header
14	PS/2 keyboard (purple)	**34**	Stereo audio line output header	**54**	SATA connectors
15	Serial port	**35**	Buzzer	**55**	Chassis fan power connector
16	Parallel port	**36**	1394 controller	**56**	Primary power supply connector
17	VGA monitor	**37**	RTC battery	**57**	IDE connector
18	Ethernet port 2	**38**	1394 PHY (TSB81BA3I)	**58**	TPM header
19	I/O panel USB port 5	**39**	1394 header	**59**	FDD connector
20	I/O panel USB port 6	**40**	USB port 1 header		

1.3 Block Diagram

Figure 2 shows the block diagram of the KP915GV motherboard.

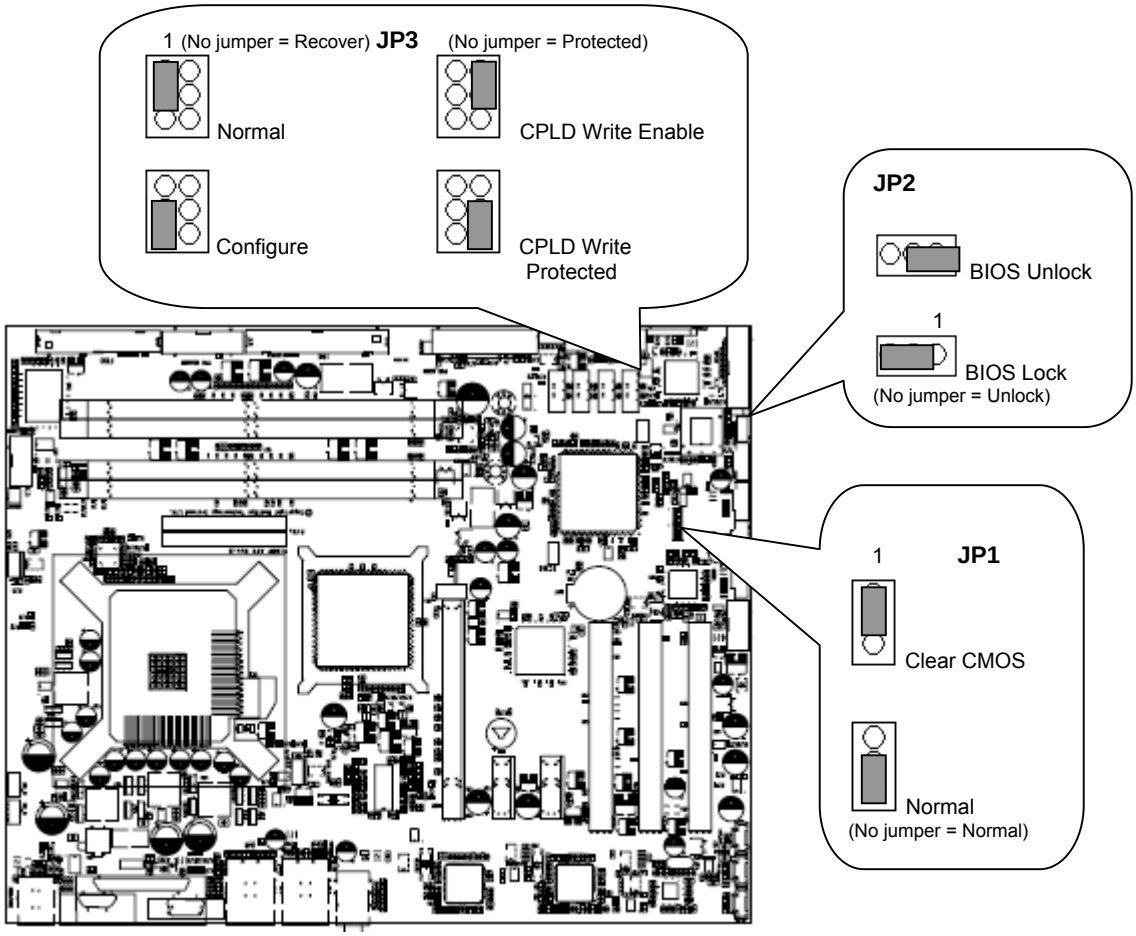
Figure 2. KP915GV Block diagram



1.4 Configuration

The majority of the configuration of the motherboard is done through the Setup utility built into the BIOS – discussed later in this document. There are, however, a number of jumpers that control the operation of the motherboard as described below. Some jumpers are not fitted to certain products.

Figure 3. Jumpers



1.4.1 Operation Mode Selection Jumper (JP3)

This jumper selects one of the following operating modes for the motherboard (pins 1, 3, 5) and controls write capability for the CPLD content (pins 2, 4, 6).

Normal Mode (Jumper between pins 1 & 3) This is the factory default position the jumper should be in for normal operation of the motherboard.

Configure Mode (Jumper between pins 3 & 5) With the jumper in this position the motherboard automatically runs the BIOS Setup utility regardless of the state of the Setup disable flag that can be set in the BIOS defaults. In this mode, the CMOS RAM contents are ignored and the defaults are used to configure the motherboard.

Recover Mode (No jumper) With no jumper installed on pins 1, 3, and 5 recovery mode is entered. The motherboard does not boot and waits until a valid recovery diskette is detected and then copies new BIOS into the ROM. The motherboard must be powered down and then re-powered with the jumper in the normal position before normal operation can resume.

CPLD Write Enabled (Jumper between pins 2 & 4) In this position the contents of the CPLD can be reprogrammed.

CPLD Write Protected (Jumper between pins 4 & 6) This is the factory default position. In this position, or with no jumper on pins 2, 4, and 6, the contents of the CPLD are protected from reprogramming.

1.4.2 BIOS Boot Block Write Protection Jumper (JP2)

(Jumper between pins 1 & 2) This is the factory default position. A jumper installed in this position. or no jumper installed, enables changes to contents of BIOS ROM boot block (unlocked position). Some motherboard applications may want to have boot block write-protected BIOS. This can be provided via the BIOS boot block write protection jumper. If a jumper is installed between pins 2 & 3 (locked position), the contents of BIOS ROM boot block cannot be changed in any way.

1.4.3 Clear CMOS Jumper (JP1)

(Jumper between pins 2 & 3) This is the factory default position. Either this position or no jumper installed, is the normal operating configuration. Installing a jumper between pins 1 & 2 clears (resets) the CMOS.

1.4.4 Front Panel Connections

The primary controls and indicators for the motherboard are connected via the front panel connector using either a single ribbon cable to a 'front panel' assembly, or using a number of small PC-standard connectors. The functions are described below. See appendix B for the connector pin-out information.

Power LED

Connects either a single-color LED (usually green) or a two-terminal bi-color LED (usually green/yellow) to indicate the powered status of the motherboard. In both cases, the 'green' anode should be attached to pin 2 of the front panel connector. Refer to the Enhanced Power Management LED portion in section 3.3.4.4 of this document for further information.

Power Switch

If the motherboard is used with a soft-switch power supply, a momentary switch should be connected between pins 6 and 8 of the power switch connections on the front panel connector. If the switch is closed for greater than approximately 4 seconds, the motherboard powers off immediately, regardless of the state of the operating system, losing any system context information. This input is redundant when using a hard-switch power supply.

Reset Switch

If used, a momentary switch connected between pins 5 and 7 will cause the motherboard to restart when closed.

Hard Disk LED

To indicate hard disk activity on either of the two ATA channels, a single color LED should be connected between pins 1 (anode) and 3.

Speaker

Connect an external speaker between pins 10 and 12 or 10 and 16. This is used only for the PC 'beep' functions. The speaker should typically be 8Ω.

Tamper Switch

To make use of the tamper detection logic of the motherboard, connect a momentary switch between pins 18 and 20. The switch should be open when the chassis is closed.

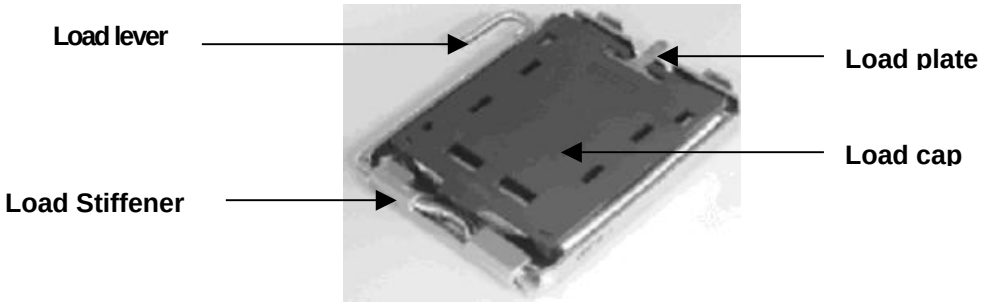
1.4.5 Alternate Power LED

The power LED function on the front panel connector is duplicated on the Alternate Power LED connector for use with LEDs cabled to a 3-pin connector. Do not use both the primary (front panel) and alternate connectors simultaneously.

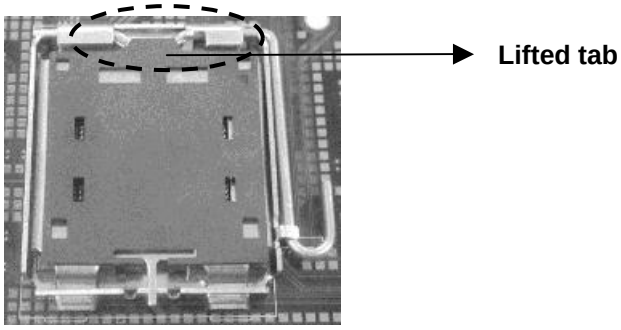
1.5 Installation of CPU

1.5.1 Installation of CPU

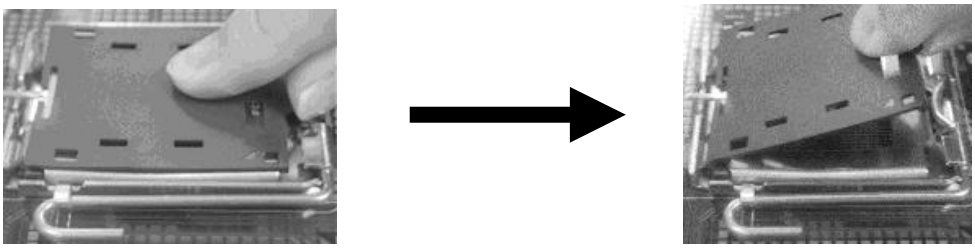
Below is the CPU socket illustration. Follow these procedures to install a CPU.



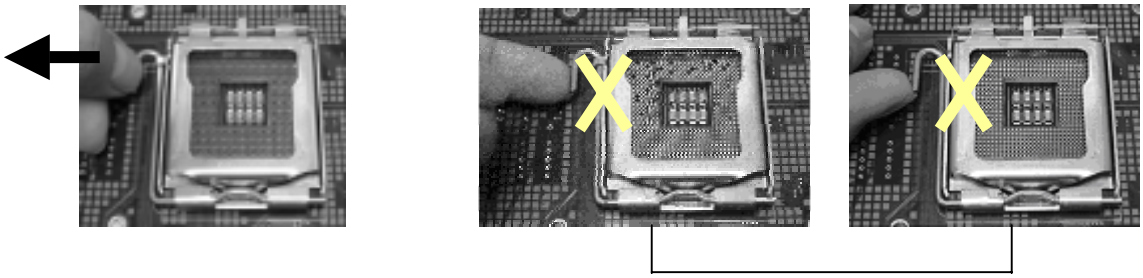
1. Use thumb & forefinger to hold the lifted tab of the cap.



2. Lift the cap up and pick to upload the cap completely from the socket.



3. Use thumb & forefinger to hold the hook of the load lever and pull the lever sideways to unlock it.



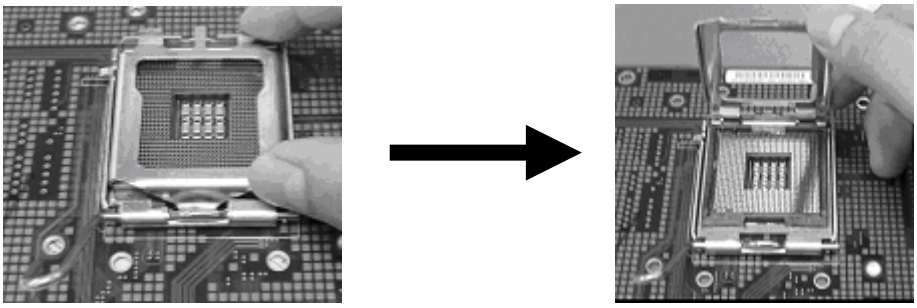
Correct

Wrong

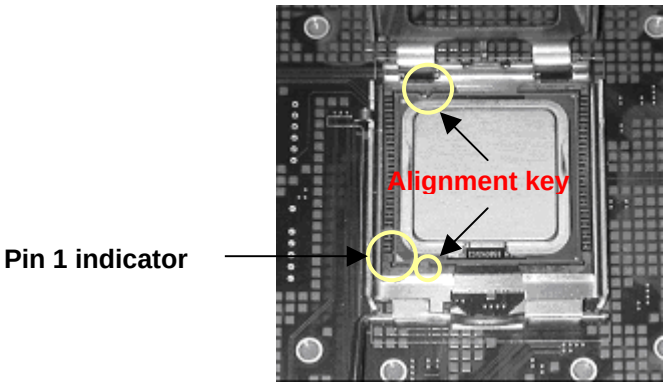
Warning:

DO NOT use finger to lift the locking lever, as injury could occur to the finger and the SKT could be damaged.

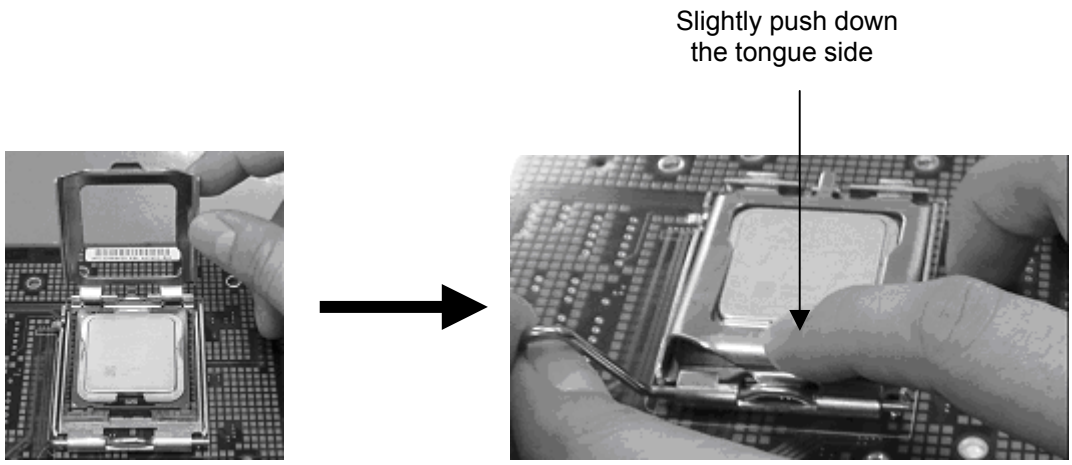
4. Lift up the lever. Use thumb to open the load plate. Be careful not to touch the contacts.



5. Hold the CPU and tilt it to some degree since the contacts are designed to be hooked, and then match the triangle marker to Pin 1 position as shown below. Carefully insert the CPU into the socket until it fits in place.


Alignment key
Pin 1 indicator

6. Close the load plate, and slightly push down the tongue side.



7. Lower the lever and lock it to the load plate, then the CPU is locked in place.

CAUTION

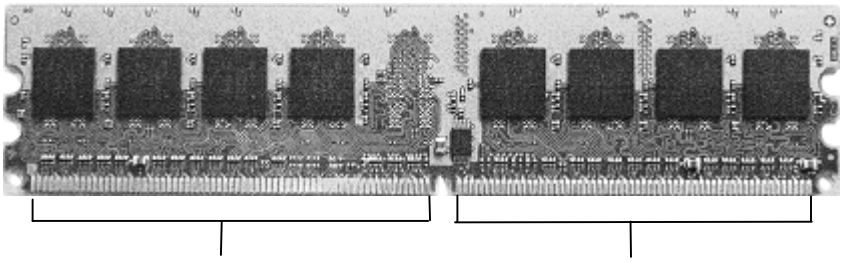
Excessive temperatures will severely damage the CPU and system. Therefore, you should install CPU cooling fan and make sure that the cooling fan works normally at all times in order to prevent overheating and damaging to the CPU. Please refer to your CPU fan user guide to install it properly.

1.5.2 Installation of Memory

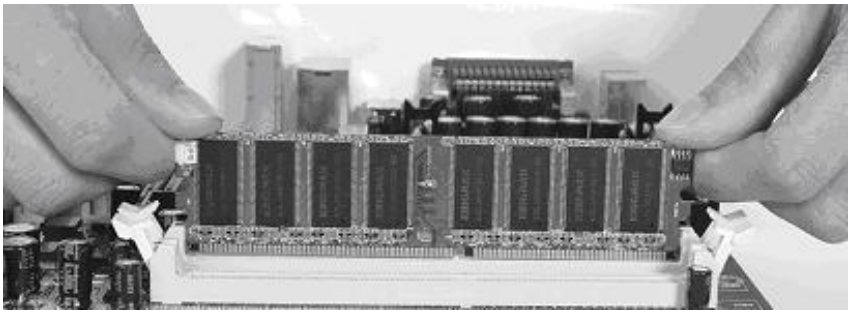
This motherboard includes four 240-pin slots with 1.8V for DDR2. You must install at least one memory bank to ensure normal operation.

Installation of DDR2 Memory

1. There is only one gap in the middle of the DIMM slot, and the memory module can be fixed in one direction only. Unlock a DIMM slot by pressing the module clips outward.
2. Align the memory module to the DIMM slot, and insert the module vertically into the DIMM slot.



3. The plastic clips at both sides of the DIMM slot will lock automatically.



CAUTION

Be sure to unplug the AC power supply before adding or removing expansion cards or other system peripherals, especially the memory devices, otherwise the motherboard or the system memory might be seriously damaged.

1.5.3 Power Supply

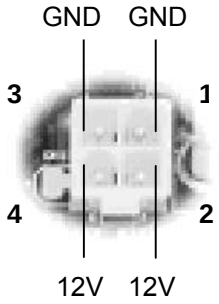
In order to avoid damaging any devices, make sure that they have been installed properly prior to connecting the power supply.

It is recommended that the board be used with a power supply that supports a minimum current load of 0.3A or less on the 5V supply rail and 2A or less on the 3.3V supply rail.

This board with CPU and memory may draw as little as 400mA of 5V and 2A of 3.3V during start-up (increases depend on installed devices). The power supply under consideration must be verified as compatible with the projected total system start-up loads for these supply rails. If the power supply minimum current level requirements are not at or below the level of current loads that are actually drawn, unpredictable start-up operation may result, such as the power supply latching off. If this occurs, the AC input to the power supply must be removed and re-attached or the power supply switch cycled off and on, in order to turn the system back on.

4-pin ATX 12V Power Connector:

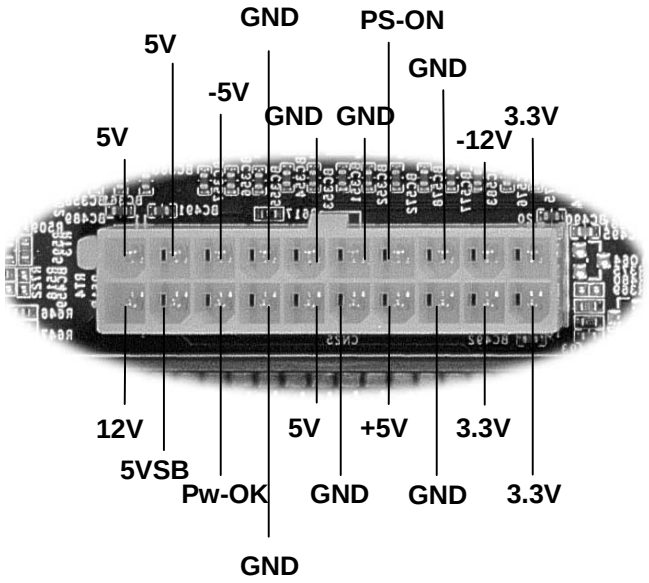
The ATX power supply connects here and provides power to the CPU.



4-pin ATX 12V power connector

KP915GV 20-pin ATX power connector:

Below is the ATX power supply connector. Make sure that the power supply cable and pins are properly aligned with the connector on the motherboard. Firmly plug the power supply cable into the connector and make sure it is secure.



20-pin ATX power connector

2 Motherboard Description

2.1 Processor Support

- Single processor support
- Intel® Pentium® 4 Processor 550/551 (3.4GHz 800MHz FSB 1MB L2)
- Intel® Celeron™ D Processor 340/341 (2.93GHz 533MHz FSB 256Kb L2)
- Follow the Design Guide in the Intel(R) Pentium(R) 4 Processor in the 775-land Package on 90 nm Process EMTS REV. NO. 1.1 and Grantsdale Chipset (915-GV) Platform Design Guide REV NO. 1.2
- Supports Pentium® 4 Processor Front Side Bus (FSB) at 533MHz (133MHz bus clock) and 800MHz (200MHz bus clock)
- Supports Hyper-Threading Technology and FSB Dynamic Bus Inversion (DBI)
- Supports 32-bit host bus addressing, allowing the CPU to access the entire 4 GB of the GMCH's memory address space

2.2 System Clocks

All clocks must comply with CK410 specifications. System clocks include as below:

- Host system (FSB 533/800MHz) 133/200MHz
- DMI (Direct Media Interface) 100 MHz
- Memory system DDR2 SDRAM 400/533MHz
- CPU/MCH/ITP CONNECTOR 200MHz
- MCH/ICH6/LAN/SATA/PCI-E slot 100MHz
- DOTCLK 96 MHz
- PCI slot/SIO/FWH/ICH6/TPM/CPLD 33 MHz
- USB/ICH6 48 MHz
- HD Audio 24.576 MHz
- ICH6/SIO 14 MHz
- RTC (OSC) 32.768 KHz
- LAN (OSC) 25 MHz

2.3 On board Clocking Block Diagram

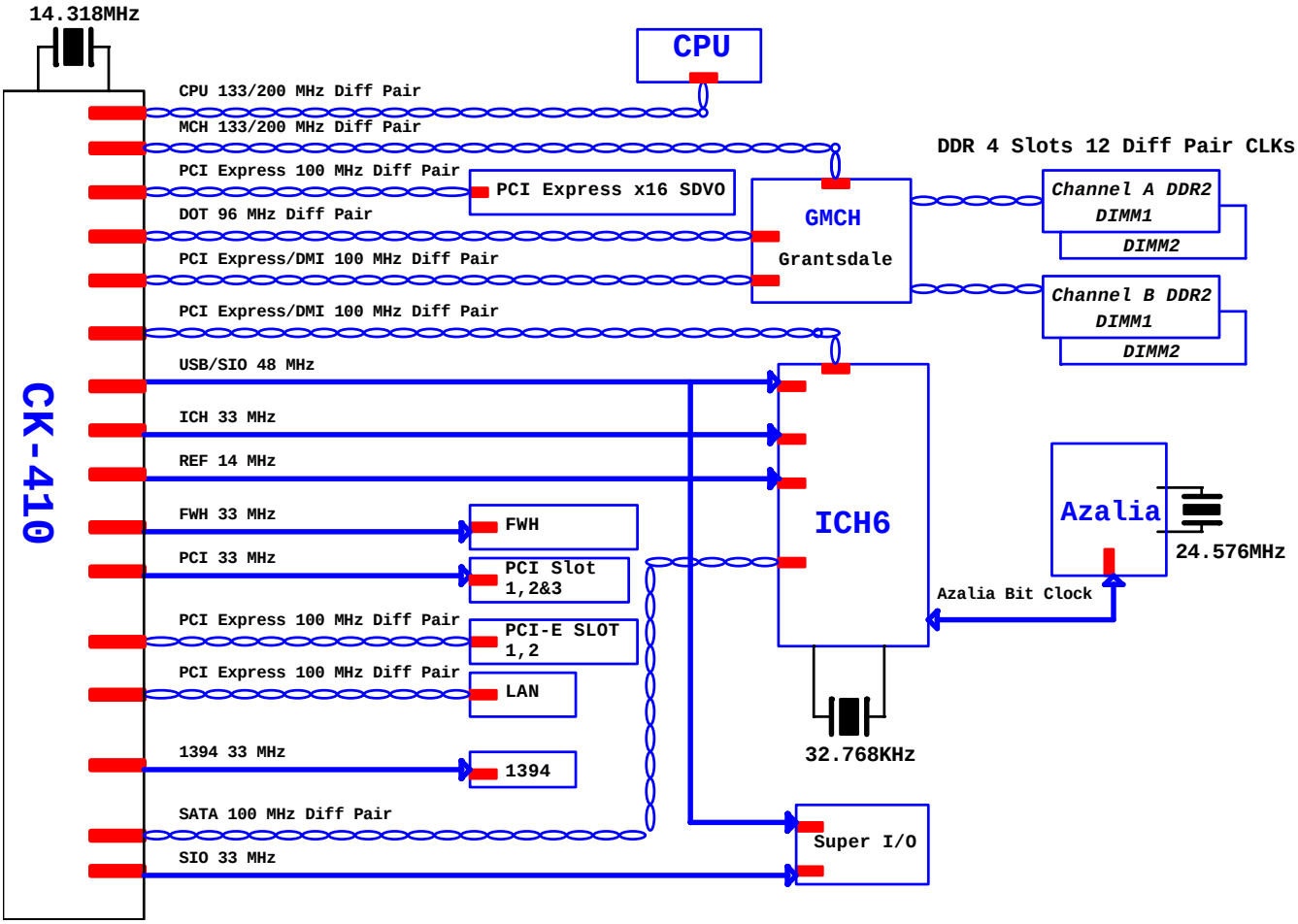


Figure 4. Clocking Block Diagram

2.4 Mechanical

- Compliant with the ATX 2.03 specification
- Lead-free design
- 4-layer PCB, components top side only, immersion silver surface finish
- Screen printing includes RadiSys product code, RadiSys part number, RadiSys branding, selected component reference designators, and UL and WEEE directive logos.

2.5 Expansion Slot Types

Table 1. KP915GV Motherboard					
Chipset	**Form Factor**	**PCI-E x16 or ADD2**	**PCI-E x1**	**PCI**	**PCI Riser Extension**
915GV	ATX	1	2	3	N/A

- See Figure 5 for slot configurations
- ADD2 will be a green connector

2.6 915GV Chipset Feature

The 915GV is a Memory Controller Hub (MCH) designed for use with the Prescott processors in desktop platforms. The role of a MCH is a system is to manage the flow of information between its four interfaces: the CPU interface (FSB), the DDR/DDR2 System Memory interface (DRAM controller), the External Graphics interface (PCI Express-G), and the I/O Controller through Direct Media Interface (DMI). It's 1210 Flip Chip Ball Grid Array (FCBGA) package.

Processor/Host interface (FSB)

- Supports a single Pentium 4 processor with 1-MB L2 cache in the 90 nm process, in an LGA775 package.
- The primary enhancements over the Compatible Mode P6 bus protocol are:
  1- Source synchronous double-pumped (2x) Address
  2- Source synchronous quad-pumped (4x) Data
- Supports Pentium 4 processor FSB interrupt delivery.
- Supports Pentium 4 processor Front Side Bus (FSB) at the following Frequency Ranges: 533/800MT/s (133/200MHz)
- Supports Hyper-Threading Technology (HT Technology)
- Supports FSB Dynamic Bus Inversion (DBI)
- Supports 36-bit host bus addressing, allowing the CPU to access the entire 4GB of the MCH's memory address space.
- 12-deep In-Order Queue to support up to twelve outstanding pipelined address requests on the host bus.
- 1-deep Defer Queue.
- Utilizes GTL+ bus driver with integrated GTL termination resistors.
- Supports a Cache Line Size of 64 bytes.
- At 133/200MHz bus clock the address signals run at 266/400MT/s, the data is quad pumped and an entire 64B cache line can be transferred in two bus clocks. At 133/200MHz bus clock the data signals run at 533/800MT/s for a maximum bandwidth of 4.3GB/s.

System Memory Controller

- The MCH System Memory Controller directly supports dual channel of memory (each channel consisting of 64 data lines)
  1- The memory channels are asymmetric: "Stacked" channels are assigned address serially. Channel B addresses are assigned after all Channel A addresses.
  2- The memory channels are interleaved: Addresses are ping-ponged between the channels after each cache line (64-B boundary).
- Supports DDR2 memory DIMM frequencies of 400 and 533MHz. The speed used in all channels is the speed of the slowest DIMM in the system.

- Support for non-ECC memory, unbuffered DIMMs only, in 256MB, 512MB, 1GB, and 2GB sizes, which may be installed as single DIMMs if desired. If a total of 4GB of DIMMs is installed, the maximum available memory will be approximately 3.24GB, with the balance of the address space being consumed by other resources in the system.
- I/O Voltage of 1.8V for DDR2.
- Directly support only two channels of non-ECC DDR2 DIMMs.
- Supports maximum memory bandwidth of 4.2GB/s in single-channel or dual channel asymmetric mode, or 8.5GB/s in dual-channel interleaved mode assuming DDR2 533MHz.
- For dual interleaved mode, DIMMs must be installed in matched pairs, installed in DIMM sockets with identical color (e.g. locations DIMM1 and DIMM3, then DIMM2 and DIMM4).
- Supports 256Mb, 512Mb, and 1Gb technologies for x8 and x16 non-ECC DDR2 devices.
- Supports four banks for all DDR2 devices up to 512Mb densities. Supports eight banks for 1Gb DDR2 devices.
- Maximum DRAM address decode space of 4GB. (Assuming 32-bit addressing)
- Supports opportunistic refresh scheme.
- Supports page sizes of 4KB, 8KB, 16KB and 32 KB. Note 32KB is for dual-channel operation only.
- Supports up to 16 simultaneous open pages per channel
- Serial Presence Detect (SPD) scheme for DIMM detection support.
- Dual channel DDR2 for 4 X 240 pin DIMM connectors
- Support for Serial Presence Detect (SPD)
- Support for Suspend to RAM (STR) using CKE, S3 ACPI state

PCI Express Graphics Interface

- One, 16-lane PCI Express port intended for Graphics Attach, fully compliant to the PCI Express Base Specification revision 1.0a
- A base PCI Express frequency of 2.5Gb/s only.
- Raw bit-rate on the data pins of 2.5Gb/s, resulting in the real bandwidth per pair of 250MB/s given the 8b/10b encoding used to transmit data across this interface.
- Maximum theoretical realized bandwidth on the interface of 4GB/s in each direction simultaneously, for an aggregate of 8GB/s when x16.
- PCI Express Enhanced Addressing Mechanism. Accessing the device configuration space in the flat memory mapped fashion.
- Automatic discovery, negotiation, and training of link out of reset.
- Supports traditional PCI style traffic (asynchronous snooped, PCI ordering).

DMI

- A chip-to-chip connection interface to Intel ICH6.
- 2GB/s point-to-point DMI to ICH6 (1GB/s each direction).
- 100MHz reference clock (shared with PCI Express Graphics Attach).
- 32-bit downstream addressing.

2.7 Video

- Integrated Intel® GMA900 video controller
  1. Intel Infrastructure Processor Division (IPD) group Embedded Graphics or Graphics Media Accelerator (GMA) (Extreme) drivers and video BIOS
- Analog RGB output with DDC2B
  1. Graphics resolution up to 2048 x 1536 pixels with 32-bit color support at 75Hz
  2. 15-pin D-sub connector

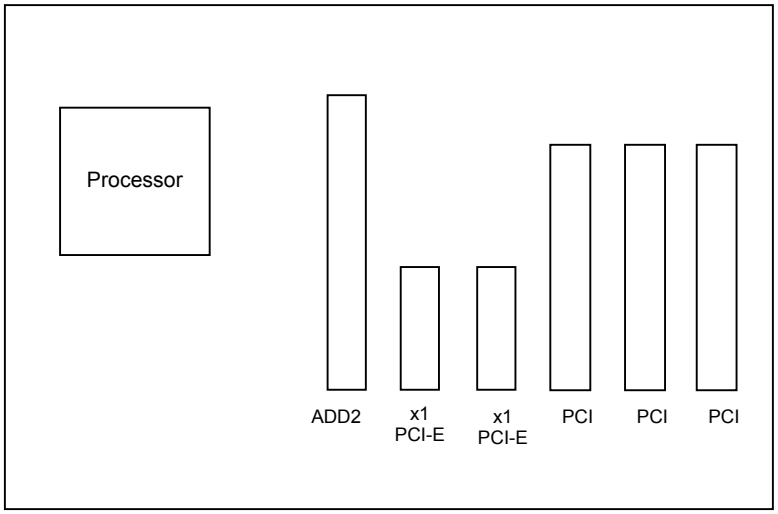


Figure 5. KP915GV Board Slot Layout

2.8 Disks

- Four 150MB/s SATA ports with locking headers
- One Ultra ATA/100 interface via on-board 40-way boxed header
- 40/80-pin cable host-side detection or forced in BIOS
- Support for hard disks and ATAPI drives
- BIOS support for 48-bit LBA (ATA drives >137GB)
- Support for USB drives including boot

2.9 Audio

SigmaTel STAC9200 audio controller with Intel High Definition Audio (HDA) compatible mode

- On-board ATAPI connectors
  - ATAPI 1: Line input connector (black)
  - ATAPI 2: Stereo AUX/MIC input connector (white)
  - ATAPI 3: Stereo Line output connector (yellow)
- Two I/O panel 3.5mm plug and play audio jacks – default connections:
  - Stereo microphone input (with support for microphone bias)
  - Stereo line output with headphone drive capability

  (Note: an option exists for a three jack connector – refer to Table 2 and comments below.)
- On-board PC beeper

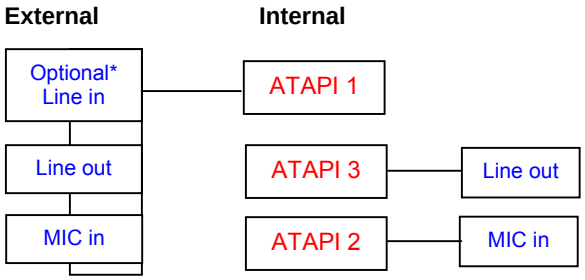


Figure 6. Audio Jack Socket and ATAPI Connectors

Table 2: Audio Channel Allocation

	I/O panel jack			Internal header	
I/O panel jack color	Pink	Lime	Blue*		
ATAPI header color			Black*	White	Yellow
Nominal function	Microphone	Line Out	Line In*	Microphone	Line Out
Line In capability	X		X		
Line Out capability		X			X
Microphone capability	X			X	
Headphone Out Capability		X			

*** If a 3 jack external connector is needed, an option could be made available, for which the added blue jack would be Line In, displacing the Line In black internal header (deleted) on the standard configuration.**

2.10 Network

- One Ethernet controller configured as either 10/100 or 10/100/Gbit at build-time
- Available with a second Ethernet controller configured as 10/100/Gbit
- 10/100Mbps Ethernet solution IEEE 802.3 10Base-T and 100Base-TX compatible
- MAC integrated into ICH with Intel 82562GZ transceiver
- Remote boot, PXE and Wake-On-LAN support
- Gbit Ethernet solutions IEEE 802.3 10Base-T, 100Base-TX, 1000Base-T compatible
- Intel 82573V (or 'L) PCI Express Ethernet controller connected via I/O hub x1 lane
- Full line-speed operation
- Remote boot, PXE and Wake-On-LAN support
- On-board RJ45 connector (RJ45 over dual USB connector) with two integral LEDs showing combined link integrity and activity (yellow) plus line speed (green/amber)
- Available with a second RJ45 over dual USB connector

2.11 I/O

- Four USB 2.0 ports on I/O panel via two dual stacked USB over RJ45 connectors
- Four USB 2.0 ports on internal locking headers
- Available with IEEE 1394b controller with support for 1394a
  - Single port via a header connector
  - Based on Texas Instruments TSB82AA2 controller and TSB81BA3 transceiver

2.12 Power Management

- Supports ACPI 2.0 with power states S0, S3, S4 (not S4BIOS), S5 and C0, C1, C2, C3
- Supports PCI PME and PCI Express power management event signaling

Table 3. ACPI Power States

G0/S0/C0	Full on
G0/S0/C1	Processor is halted
G0/S0/C2	Processor stops internal clocks
G0/S0/C3	Processor clocks are disabled and processor in sleep state
G1/S3	System context is saved to RAM and power removed from all circuits except that required to maintain system RAM and resume
G1/S4	System context is saved to disk and power removed from all circuits except that required to resume
G2/S5	Soft off, only resume logic and RTC remain powered

2.13 System management

- System monitoring of voltage, temperature, fans
- Temperature monitoring of processor die, board and remote sensor
- Direct monitoring of lithium cell voltage
- Automatic fan control for 3 fans - CPU, System 1, System 2
- Fan configuration held in BIOS customization block
- Fans can be assigned to any of three thermal zones for automatic control - each zone
- monitored by one of the three thermal sensors
- 450mA drive capability for each system fan, 2.2A for the CPU fan
- Anti-tamper security (trigger for chassis intrusion detect)
- Programmable watchdog timer with range of 1 second to 1 hour
- Access to SMBus via 4-pin 2mm header

2.14 Security

- Header for Trusted Platform Module (TPM)
- TCG 1.1 compliant

2.15 Programmable Controller (PLD)

- Programmable logic device to support configurable system functions
  - Supports software-based updates (including field updates)
  - Supports customizable logic (by RadiSys, not user customizable)
  - Option of 128 or 256 macrocell device (256 for enhanced controller)
- Controls product write-protect features for BIOS ROM
  - Allows write-protection via software or permanent protection via controller logic
  - Supports write-protect jumper covering update of controller logic (override via ICT)
- Total of 13 General purpose I/O lines
  - 10 signals that can be programmed as inputs and outputs
    - Direction control in three groups with 2, 3 and 5 bits (20:21, 15:17, 10:14)
  - Two signals that are input-only
  - One signal that is output-only
  - Support for character-based LCD panel to display BIOS POST messages and other information. Displays have an 8-bit parallel interface. Displayed text is the BIOS Port 80 codes in the format: “BIOS Code xx”

2.16 CMOS RAM and RTC

- 256 bytes of CMOS RAM
- Lithium cell with >5 years operating life

2.17 Configuration

- Majority of configuration is jumper-less and done through BIOS settings
  - Customer can specify BIOS defaults at manufacture
- Operating mode jumper selects normal, configure and recovery modes
- Power supply jumper configures the product to operate with a hard-switched power supply that must be used when the PSU does not provide 5V on the 5V standby pin
  - Target: jumper-less operation for power supply type

2.18 BIOS

- Based on Phoenix Award BIOS
- 4Mbit firmware hub BIOS ROM
  - System and (Intel) video BIOS
  - Intel Ethernet remote boot and PXE code
  - Fully customizable including video BIOS
  - ROM can be optionally socketed with write-protect support
- Silent boot (boot message hiding, logo visible), headless operation support

- All configuration is automatic - no stopping on configuration change
- Resources freed when unused

2.19 Operating Systems Support

- Windows XP Professional SP2
- Embedded Windows XP Server SP2
- Red Hat Enterprise Linux 4.0 AS
- Knoppix Linux 3.7 (selected drivers only)
- Windows 2000 Server SP4
- SUSE Linux Enterprise Server 9.0 (selected drivers only)

2.20 Power Supplies

- Support for ATX12V power supplies **(see Note below)**
- Supports hard- and soft-switched power supplies with jumper-less configuration
- See table 4 for required power supply connector.

Table 4. Power Supply Connector

Board	Connector Type
KP915GV	2 x 10 pin

It is recommended that the board be used with a power supply that supports a minimum current load of 0.3A or less on the 5V supply rail and 2A or less on the 3.3V supply rail (see note below).

Note: This board with CPU and memory may draw as little as 400mA of 5V and 2A of 3.3V during start-up (increases depend on installed devices). The power supply under consideration must be verified as compatible with the projected total system start-up loads for these supply rails. If the power supply minimum current level requirements are not at or below the level of current loads that are actually drawn, unpredictable start-up operation may result, such as the power supply latching off. If this occurs, the AC input to the power supply must be removed and re-attached or the power supply switch cycled off and on, in order to turn the system back on.

2.21 Reliability and Environmental

Table 5. Environmental Specifications

<table>
<tr><th>Characteristic</th><th>State</th><th>Value</th></tr>
<tr><td>Temperature (ambient)</td><td>Operating</td><td>0°C to +55°C
Operation above +30° C reduces the maximum operational relative humidity.</td></tr>
<tr><td></td><td>Operating gradient</td><td>±5°C per minute</td></tr>
<tr><td></td><td>Storage</td><td>-40°C to +85°C, 5°C per minute maximum excursion gradient.</td></tr>
<tr><td>Relative humidity</td><td>Operating</td><td>10% to 85% RH non-condensing at +30°C, linearly decreasing to 5% to 15.5% RH non-condensing at +65°C.</td></tr>
<tr><td></td><td>Storage</td><td>5% to 90% RH non-condensing at +40° C.</td></tr>
<tr><td>Vibration</td><td>Operating</td><td>Random 5Hz to 2kHz, 7.7grms, 10 mins in each of 3 axes
5Hz to 20Hz: 0.004g2/Hz ramping up to 0.04g2/Hz;
20Hz to 1000Hz: 0.04g2/Hz;
1000Hz to 2000Hz: 0.04g2/Hz ramping down to 0.01g2/Hz</td></tr>
<tr><td></td><td>Packaged</td><td>Random 5Hz to 2kHz, 9.7grms, 10 min. in each of 3 axes
5Hz to 20Hz: 0.006g2/Hz ramping up to 0.06g2/Hz;
20Hz to 1000Hz: 0.06g2/Hz;
1000Hz to 2000Hz: 0.06g2/Hz ramping down to 0.02g2/Hz
Sine 5Hz to 500Hz, 0.15 octave/min up and back, 10 min. dwell at 3 resonances in each of 3 axes
5 to 50Hz swept – 0.1g; 50 to 500Hz swept – 0.25g</td></tr>
<tr><td>Shock</td><td>Non-operating</td><td>30g 11ms, half-sine</td></tr>
<tr><td></td><td>Packaged</td><td>Drop test, 10-up bulk packaging, 30 inches free-fall, 152 inches/s velocity change</td></tr>
<tr><td>Altitude</td><td>Operating</td><td>To 15000 ft. (4500m)</td></tr>
<tr><td></td><td>Storage</td><td>To 40000 ft. (12000m)</td></tr>
<tr><td colspan="2">MTBF</td><td>The table below summarizes the MTBF (hr) predictions for the listed products, without the main processor, memory, or battery installed.
<table>
<tr><th>SKU</th><th>35°C</th><th>55°C</th></tr>
<tr><td>KPGV1W00</td><td>298,735</td><td>141,946</td></tr>
<tr><td>KPGV1G00</td><td>295,736</td><td>156,014</td></tr>
<tr><td>KPGVFG00</td><td>280,528</td><td>147,801</td></tr>
</table></td></tr>
<tr><td colspan="2">Airflow</td><td>Base on standard Intel guidelines</td></tr>
<tr><td colspan="2">Fuses</td><td>Self-resetting PTC fuse (fuses automatically reset without user intervention once the load had been removed)</td></tr>
</table>

2.22 Regulatory Compliance

Table 6. Regulatory Testing*

Characteristic	State	Value
ESD	Operating	Designed and tested to pass (not certified): To IEC 1000-4-2 / EN61000-4-2: 1995 4kV direct contact, performance criteria B 6kV direct contact, performance criteria C 4kV air discharge, performance criteria B 8kV air discharge, performance criteria C
Fast transient/burst	Operating	Designed and tested to pass (not certified): IEC 1000-4-4/EN61000-4-4: 1995, performance criteria B
Surge voltages	Operating	Designed and tested to pass (not certified): IEC 1000-4-5 / EN61000-4-5: 1995, performance criteria B
Conducted	Operating	Designed and tested to pass (not certified): IEC 1000-4-6 / EN61000-4-6: 1995, performance criteria B
Radiated emissions	Operating	Designed and tested to pass (not certified): CISPR 22: 1998, Class B EN55022, EN55024 FCC Class B
Radiated immunity	Operating	EN61000-4-3, performance criteria A
Conducted immunity	Operating	EN61000-4-6, performance criteria A
AC power dips and interrupts	Operating	EN61000-4-11performance criteria B and C
Safety		UL60950-1, CSA60950-1, EN60950-1, IEC60950-1 CB report to IEC60950-1 Recognized component to UL60950-1 UL60950-1 approval will become accessory listing in Q405

* EMC and immunity testing performed in an example standard desktop chassis.

3 Specifications

3.1 Product Basis

This product based on the Intel® 915GV Express chipset, designed for the Intel® Pentium® 4 processor with Hyper-Threading (HT) Technology in the LGA775 package, and is flexible for specific customer needs.

3.2 Non-Core Integrated Sub-systems

3.2.1 I/O Controller Hub 6 (ICH6)

The sixth generation I/O Controller Hub (Intel ICH6) component provides data buffering and interface arbitration required to ensure that system interfaces operate efficiently and provides the bandwidth necessary to enable the system to obtain peak performance. The ICH6 supports connection to the MCH via the Direct Media Interface. The ICH6 provides up to 4 PCI Express root ports, which are compliant to the PCI Express Base Specification revision 1.0a. The ICH6 is capable of supporting four SATA ports at generation 1 speeds, eight USB2.0 ports, and up to IDE devices. The ICH6 additionally features an integrated High Definition Audio controller to support extreme multimedia applications and differentiation through the use of a variety of third party audio codecs. The ICH6 features on the KP915GV board include:

- Direct Media Interface
  - 10Gb/s each direction, full duplex
  - Transparent to software
- PCI Express
  - 4 PCI Express root ports
  - Fully PCI Express 1.0a compliant
  - Ports 1-4 can be statically configured as 4x1, or 1x4 (Enterprise applications only)
  - Support for full 2.5Gb/s bandwidth in each direction per x1 lane
- PCI Bus Interface
  - Supports PCI-X Rev 2.2 Specification at 66 MHz
  - Seven available PCI REQ/GNT pairs
  - Support for 64-bit addressing on PCI using DAC protocol
- Integrated Serial ATA Host Controllers
  - Two ports on board
  - Data transfer rates up to 1.5Gb/s (150 MB/s)
  - Integrated AHCI controller (ICH6R/ICH6RW Only)
- Integrated IDE Controller
  - Independent timing of up to two drives
  - Ultra ATA/100/66/33, BMIDE and PIO modes
  - Tri-state modes to enable swap bay
- Intel High Definition Audio Interface

- PCI Express endpoint
- Independent Bus Master logic for eight general purpose streams: Four input and four output
- Support three external Codecs
- Supports variable length stream slots
- Supports multimedia channel, 32-bit sample depth, 192kHz sample rate output
- Provides Mic array support
- Supports memory-based command/response transport
- Allows for non-48kHz sampling output
- Support for ACPI Devices States

- AC-Link for Audio and Telephony codecs
  - Support for three AC'97 2.3 codecs.
  - Independent bus master logic for 8 channels (PCM In/Out, PCM2 In, Mic 1 Input, Mic 2 Input, Modem In/Out, S/PDIF Out)
  - Support for up to six channels of PCM audio output (full AC3 decode)
  - Supports wake-up events
- USB 2.0
  - Includes four UHCI Host Controllers, supporting eight external ports
  - Includes one EHCI Host Controller that supports all eight ports
  - Includes one USB2.0 High-Speed Debug Port
  - Supports wake-up from sleeping states S1-S5
  - Supports legacy Keyboard/Mouse software
  - Maximum total current for all USB devices is 3A
- Integrated LAN Controller
  - Integrated ASF Management Controller
  - WfM2.0 and IEEE802.3 Compliant
  - LAN Connect Interface (LCI)
  - 10/100Mb/s Ethernet Support
- Power Management Logic
  - ACPI 2.0 compliant
  - ACPI-defined power states (C1, S1, S3-S5 for Desktop)
  - ACPI Power Management Timer
  - PCI CLKRUN# and PME# support
  - SMI# generation
  - All registers readable/restorable for proper resume from 0V suspend states

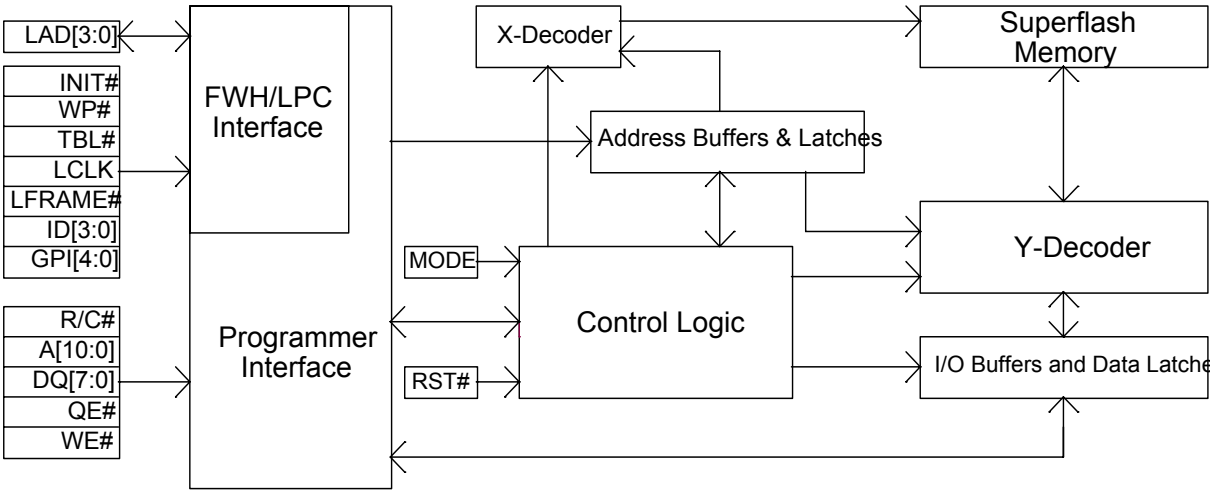
- Support for APM-based legacy power management for non-ACPID Desktop implementation

- External Glue Integration
  - Integrated Pull-op, Pull down and Series Termination resistors on IDE, processor I/F
  - Integrated Pull-down and Series resistors on USB
- Enhanced DMA Controller
  - Two cascaded 8237 DMA controller
  - Supports LPC DMA
- SMBus
  - Flexible SMBus/SMLink architecture to optimize for ASF
  - Provides independent manageability bus through SMLink interface
  - Supports SMBus 2.0 Specification
  - Host interface allows processor to communicate via SMBus
  - Compatible with most two-wire components that are also I2C compatible
  - Slave interface allows an internal or external Microcontroller to access system resources
- High Precision Event Timers
  - Advanced operation system interrupt scheduling
- Timers Based on 82C54
  - System timer, Refresh request, Speaker tone output
- Real-Time Clock
  - 256-byte battery-backed CMOS RAM
  - Integrated oscillator components
  - Lower Power DC/DC Converter implementation
- System TCO Reduction Circuits
  - Timers to generate SMI# and Reset upon detection of system hang
  - Timer to detect improper processor reset
  - Integrated processor frequency strap logic
  - Supports ability to disable external devices
- Interrupt Controller
  - Supports up to eight interrupt pins
  - Supports PCI 2.3 Message Signaled Interrupts
  - Two cascaded 82C59 with 15 interrupts
  - Integrated I/O APIC capability with 24 interrupts
  - Supports Processor System Bus interrupt delivery
- 1.5V operation with 3.3V I/O

- 5V tolerant buffers on IDE, PCI, and Legacy signals
- Integrated 1.5V Voltage Regulator (INTVR) for the Suspend and LAN wells
- Firmware Hub I/F supports BIOS Memory size up to 8 MBytes
- Low Pin Count (LPC) I/F
  - Supports two Master/DMA devices
  - Support for Security Device (Trusted Platform Module) connected to LPC
- GPIO, TTL, Open-Drain, Inversion
- Package 31x31 mm 609 pin mBGA

3.2.2 Flash BIOS

The SST 49LF004B (512K x 8) 4Mb Flash EEPROM, This flash memory device is designed to interface with host controllers (chipsets) that support a Low Pin Count (LPC) interface for BIOS applications. The SST49LF004B devices comply with Intel's LPC Interface Specification 1.1, supporting single-byte Firmware Memory and LPC Memory cycle types. It as a flash BIOS and it will be implemented via the NS PC8374K Super I/O.



FUNCTIONAL BLOCK DIAGRAM

Figure 7. SST 49LF004B Functional Block Diagram

- Conforms to Intel LPC Interface Specification 1.1
  - Supports Single-Byte LPC Memory and Firmware Memory Cycle Types
- Flexible Erase Capability
  - Uniform 64 KByte overlay blocks for SST49LF004B
  - Chip-Erase for PP Mode Only
- Single 3.0-3.6V Read and Write Operations
- Superior Reliability
  - Endurance: 100,000 Cycles (typical)

- Greater than 100 years Data Retention

- Low Power Consumption
  - Active Read Current: 6 mA (typical)
  - Standby Current: 10 µA (typical)
- Fast Sector-Erase/Byte-Program Operation
  - Sector-Erase Time: 18 ms (typical)
  - Block-Erase Time: 18 ms (typical)
  - Chip-Erase Time: 70 ms (typical)
  - Byte-Program Time: 14 µs (typical)
  - Chip Rewrite Time: SST49LF004B: 8 seconds (typical)
  - Single-pulse Program or Erase
  - Internal timing generation
- Two Operational Modes
  - Low Pin Count (LPC) interface mode for in-system operation
  - Parallel Programming (PP) mode for fast production programming
- LPC Interface Mode
  - LPC bus interface supporting byte Read and Write
  - 33 MHz clock frequency operation
  - WP# and TBL# pins provide hardware write protect for entire chip and/or top Boot Block
  - Block Locking Registers for individual block write-lock and lock-down protection
  - JEDEC Standard SDP Command Set
  - Data# Polling and Toggle Bit for End-of-Write detection
  - 5 GPI pins for system design flexibility
  - 4 ID pins for multi-chip selection
- Parallel Programming (PP) Mode
  - 11-pin multiplexed address and 8-pin data I/O interface
  - Supports fast In-System or PROM programming for manufacturing
- Packages 32 pin lead PLCC (10mm x 20mm)

3.3 Major Sub-systems

3.3.1 Audio Interface

The motherboard includes High Definition integrated audio function support, using the ICH6 integrated audio controller and a SigmaTel STAC9200. The STAC9200 is a high quality, 2-channel audio codec compatible with the Intel High Definition (HD) Audio Interface. The STAC9200 provides Stereo 24-Bit resolution with sample rates up to 192kHz. The STAC9200 incorporates SigmaTel's proprietary SD technology to achieve an estimated DAC SNR in excess of 100dB. See Figure 8.

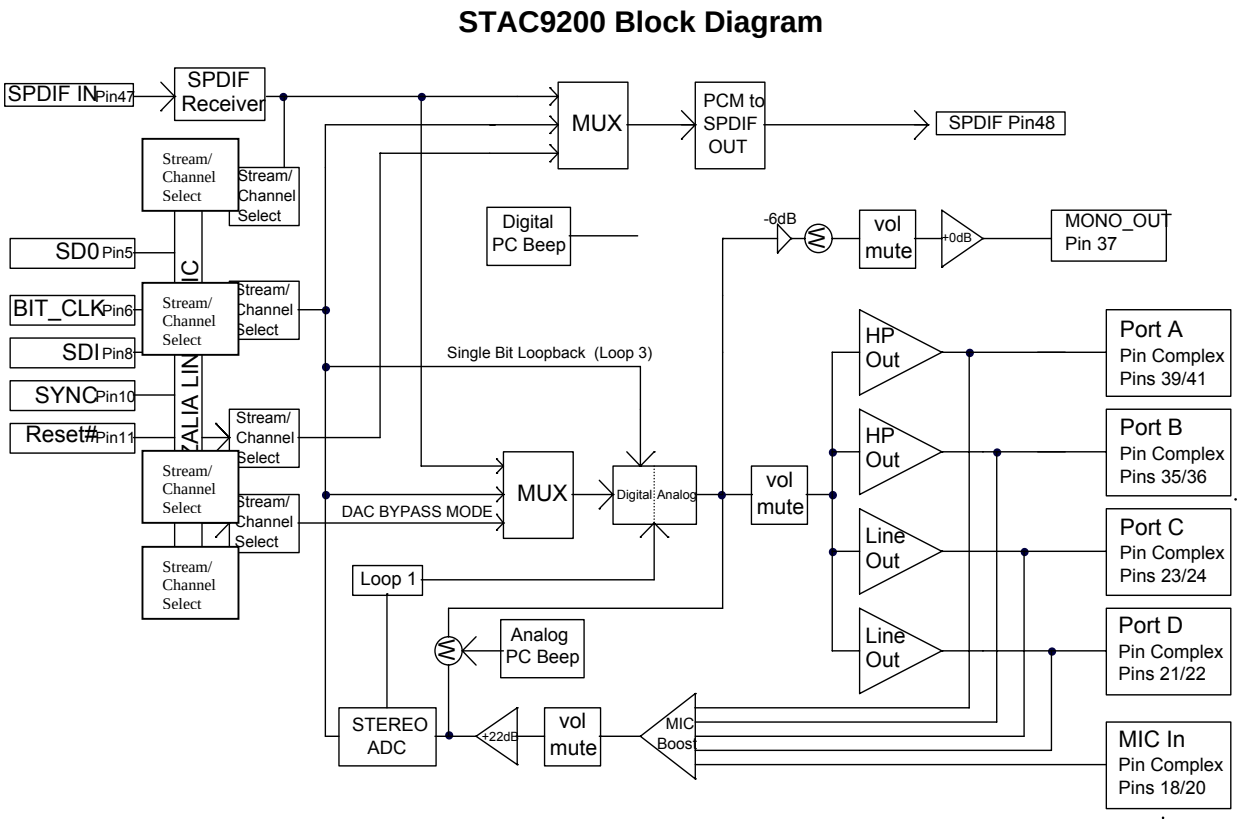


Figure 8. SigmaTel STAC9200 High Definition Block Diagram

The audio Codec includes:

- High performance ΣΔ technology
- 100dB DAC SNR
- Intel HD Audio Interface
- Two Channel DACs and ADCs with 24-bit resolution Sample rates up to 192kHz
- Mixer-less design
- Low-latency Karaoke Mode Supported
  - Integrated Headphone Amps
- Stereo Microphone
  - Supports Stereo Mic
  - Microphone Boost 0, 10, 20, 30, 40dB
  - Direct CDROM Recording Mixerless Design
  - Universal Jacks (TM) Functionality for jack retasking
  - Adjustable VREF Out
  - Digital PC Beep to all outputs • +3.3V and +5V analog power supply options
  - 32-pad QFN (5mm x 5mm) and 48-pin LQFP package options

- Package 48-pin Lead Free LQFP

3.3.2 Hardware Management Interface

The LM96000, hardware monitor, has a two wire digital interface compatible with SMBus 2.0. Using an 8-bit ΣΔ ADC, the LM96000 measures:

- The temperature of two remote diode connected transistors as well as its own die
- The VCCP, 2.5V, 3.3VSBY, 5.0V, and 12V supply (internal scaling resistors).

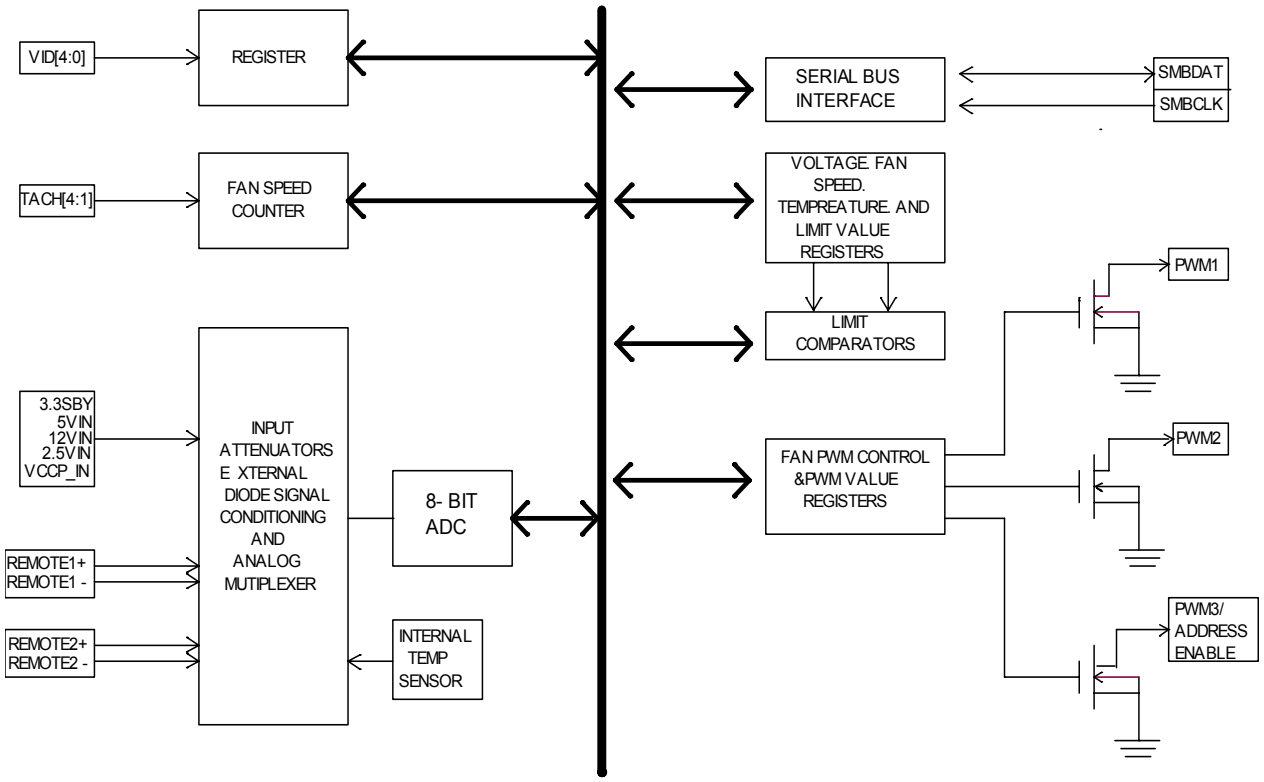


Figure 9. NS LM96000CIM Block Diagram

- 2-wire, SMBus 2.0 compliant, serial digital interface
- 8-bit ΣΔ ADC
- Monitors VCCP, VRTC battery, 3.3 VSBY, 5.0V, and 12V motherboard/processor supplies
- Monitors 2 remote thermal diodes
- Programmable autonomous fan control based on temperature readings
- Noise filtering of temperature reading for fan control
- 1.0°C digital temperature sensor resolution
- 3 PWM fan speed control outputs
- Provides high and low PWM frequency ranges
- 4 fan tachometer inputs
- Monitors 5 Voltage Identification (VID) control lines

- XOR-tree test mode
- Package 24-pin Lead TSSOP

3.3.3 Ethernet Interface

Either one or two IEEE 802.3 compatible Ethernet ports are available as build options that are based around Intel controllers (82562GZ and 82573V or 'L) to provide 10/100Mbps and/or 10/100/1000Mbps configuration. Connection to the network is achieved through two RJ45 connectors, available on the I/O (Input/Output) panel, which have integral LED's to provide Link status information.

- Intel 82562GZ 10/100BASE-TX Fast Ethernet Controller
  - IEEE 802.3 10BASE-T/100BASE-TX compliant physical layer interface
  - IEEE 802.3u Auto-Negotiation support
  - Digital Adaptive Equalization control
  - Link status interrupt capability
  - XOR tree mode support
  - 3-port LED support (speed, link and activity)
  - 10BASE-T auto-polarity correction
  - LAN Connect interface
  - Alert on LAN Functionality, ASF 1.0 alerting
  - Diagnostic loop-back mode
  - 1:1 transmit transformer ratio support
  - Low power (less than 300 mW in active transmit mode)
  - Reduced power in "unplugged mode" (less than 50 mW)
  - Automatic detection of "unplugged mode"
  - 3.3 V device
  - Package 15x15 mm 196 pin BGA
- Intel 82573V (or 'L) 10/100/1000BASE-T Gigabit Ethernet Controller
  - Uses x1 PCI-E on ICH6
  - Peak bandwidth 2Gb/s per direction
  - PCI-E power management
  - Optimized transmit and receive queues
  - IEEE802.x compliant flow control support with software controllable pause times and threshold values
  - Integrated PHY for 10/100/1000 Mbps full and half duplex operation
  - DSP architecture implements digital adaptive equalization, echo cancellation, and cross-talk cancellation
  - Advanced packet filtering
  - Intel Active Management Technology

- Support ASF1.0 and 2.0 alerting
- Support Wake On LAN (WOL) and ACPI
- Programmable LED functionality
- On-chip power control circuitry
- Loop-back capabilities
- IEEE 802.3ab Auto-Negotiation support and PHY compliance with compatibility
- Package 15x15 mm 196 pin TF-BGA

3.3.4 Super I/O Interface

The motherboard is designed to support the NS PC8374K controller. The Super I/O provides support that includes floppy, PS/2, serial port, and parallel port to rest of platform through the ICH6 via the Low Pin Count (LPC) interface.

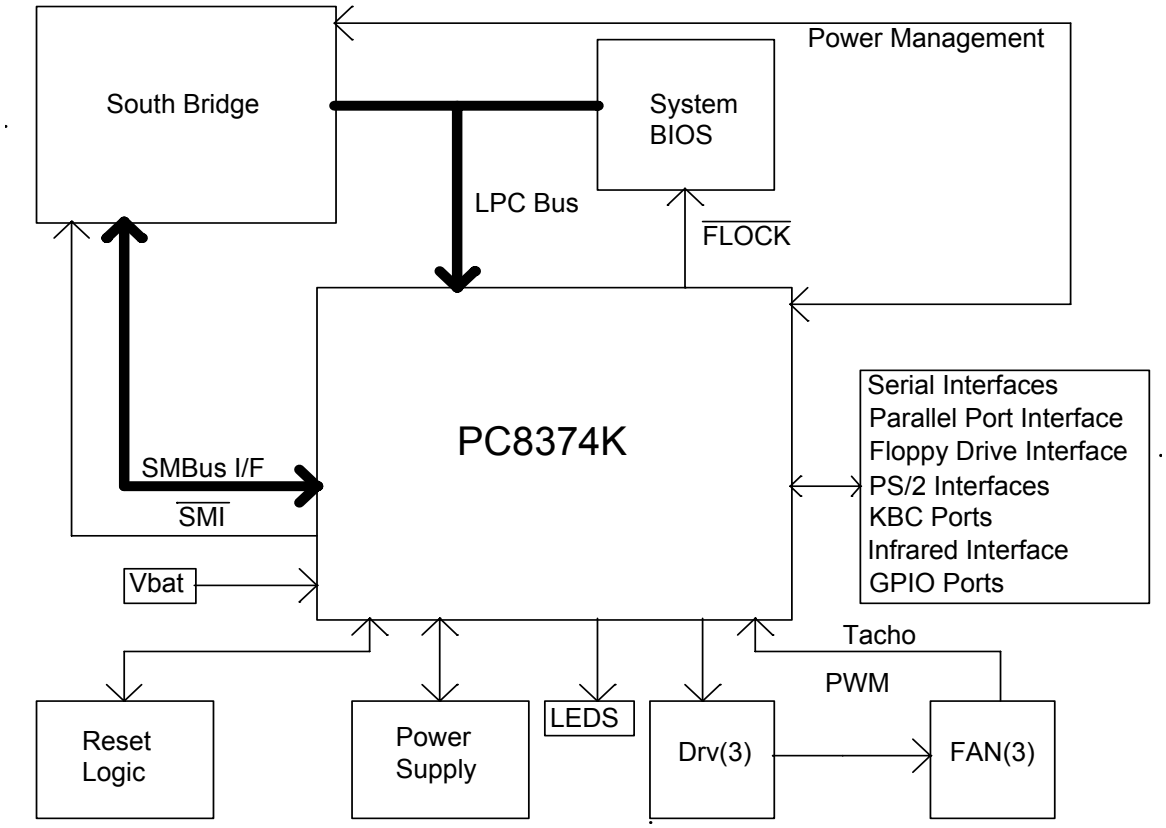


Figure 10. PC8374K Block Diagram

3.3.4.1 System Health Support

- Fan Monitor and Control
  - Three PWM-based fan controls
  - Four 16-bit resolution tachometer inputs
  - Software or local temperature feedback control

- Heceta6-compatible register set accessible via the LPC interface and SMBus
  - Supports the following combinations of LMxx devices:
    - LM41 and optional LM30
    - LM32
    - LM40
  - Simultaneous read support via LPC interface and SMBus
- Generates SMI on critical temperature event

3.3.4.2 Glue Functions

- Flash Write Protect control (using GPIO) with optional SMI generation when cleared
- Floppy Disk Drive Write Protect (WGATE) lockable control (cleared only by hardware reset)
- Generates the power-related signals:
  - Main Power good
  - Power distribution control (for switching between Main and Standby regulators)
  - Resume reset (Master Reset) according to the 5V standby supply status
  - Main power supply turn on (PS_ON)
- Voltage translation between 2.5V or 3.3V levels (DDC) and 5V levels (VGA) for the SMBus serial clock and data signals
  - Isolation circuitry for the SMBus serial clock and data signals
  - Buffers PCI_RESET to generate three reset output signals
  - Buffers PWRGD_PS to generate IDE reset output.
- Generates “highest active supply” reference voltage
  - Based on 3.3V and 5V Main supplies
  - Based on 3.3V and 5V Standby supplies
- High-current LED driver control for Hard Disk Drive activity indication
- Software selectable alternative functionality, through pin multiplexing

3.3.4.3 General-Purpose I/O (GPIO) Ports

- All 16 GPIO ports powered by Voltage Standby 3V (VSB3)
- Each pin individually configured as input or output
- Programmable features for each output pin:
  - Drive type (open-drain, push-pull or TRI-STATE)
  - TRI-STATE on detection of falling VDD3 for VSB3-powered pins driving VDD-supplied devices
- Programmable option for internal pull-up resistor on each input pin (some with internal pull-down resistor option)

- Lock option for the configuration and data of each output pin
- 15 GPIO ports generate IRQ/SMI/SIOPME# for wake-up events; each GPIO has separate:
    - Enable control of event status routing to IRQ
    - Enable control of event status routing to SMI
    - Enable control of event status routing to SIOPME# (via SWC)
    - Polarity and edge/level selection
    - Programmable de-bouncing

3.3.4.4 Power Management

- Supports ACPI Specification Revision 2.0b, July 27, 2000
- System Wake-Up Control (SWC)
    - Optional routing of events to generate SCI (SIOPME#) on detection of:
        - Keyboard or Mouse events
        - Ring Indication RI on each of the two serial ports
        - General-Purpose Input Events from 15 GPIO pins
        - IRQs of the Keyboard and Mouse Controller
        - IRQs of the other internal modules
    - Optional routing of the SCI (SIO PME#) to generate IRQ (SERIRQ)
    - Implements the GPE1_BLK of the ACPI General Purpose (Generic) Register blocks with child” events
    - VSB3-powered event detection and event-logic configuration
- Enhanced Power Management (PM), including:
    - Special configuration registers for power down
    - Low-leakage pins
    - Low-power CMOS technology
    - Ability to disable all modules
    - High-current LED drivers control (two LEDs) for power status indication with:
    - Standard blinking, controlled by software
    - Advanced blinking, controlled by power supply status, sleep state or software
    - Special blinking, controlled by power supply status, sleep state and software bit
    - VBAT-powered indication of the Main power supply state before an AC power failure
- Keyboard Events
    - Wake-up on any key

- Supports programmable 8-byte sequence “Password” or “Special Keys” for Power Management
- Simultaneous recognition of three programmable keys (sequences): “Power”, “Sleep” and “Resume”
- Wake-up on mouse movement and/or button click

3.3.4.5 Bus Interface

- LPC Bus Interface
  - Based on Intel’s LPC Interface Specification Revision 1.1, August 2002
  - I/O, Memory and 8-bit Firmware Memory read and write cycles
  - Up to four 8-bit DMA channels
  - Serial IRQ (SERIRQ)
  - Supports registers memory and I/O mapping
- Configuration Control
  - PnP Configuration Register structure
  - PC01 Specification Revision 1.0, 1999-2000 compliant
  - Base Address strap (BADDR) to setup the address of the Index-Data register pair (defaults to 2Eh/2Fh)
  - Flexible resource allocation for all logical devices:
    - Re-locatable base address
    - 15 IRQ routing options to serial IRQ
    - Up to four optional 8-bit DMA channels
  - Configurable feature sets:
    - Software selectable
    - VSB3-powered pin multiplexing

3.3.4.6 Legacy Modules

- Serial Ports 1 and 2
  - Software-compatible with the NS16550A and NS16450
  - Support shadow register for write-only bit monitoring
  - Data rates up to 1.5 Mbaud
- Serial Infrared Port (SIR)
  - Software compatible with the 16550A and the 16450
  - Shadow register support for write-only bit monitoring
  - HP-SIR
  - ASK-IR option of SHARP-IR
  - DASK-IR option of SHARP-IR

- Consumer Remote Control supports RC-5, RC-6, NEC, RCA and RECS 80

- IEEE 1284-compliant Parallel Port
  - ECP, with Level 2 (14 mA sink and source output buffers)
  - Software or hardware control
  - Enhanced Parallel Port (EPP) compatible with EPP 1.7 and EPP 1.9
  - Supports EPP as mode 4 of the Extended Control Register (ECR)
  - Selection of internal pull-up or pull-down resistor for Paper End (PE) pin
  - Supports a demand DMA mode mechanism and a DMA fairness mechanism for improved bus utilization
  - Protection circuit that prevents damage to the parallel port when a printer connected to it is powered up or is operated at high voltages (in both cases, even if the PC8374K is in power-down state)
- Floppy Disk Controller (FDC)
  - Software compatible with the PC8477 (the PC8477 contains a superset of the FDC functions in the µDP8473, NEC µPD765A/B and N82077 devices)
  - Error-free handling of data overrun and underrun
  - Programmable write protect
  - Supports FM and MFM modes
  - Supports Enhanced mode command for three-mode Floppy Disk Drive (FDD)
  - Perpendicular recording drive support for 2.88 MBytes
  - Burst (16-byte FIFO) and Non-Burst modes
  - Full support for IBM Tape Drive Register (TDR) implementation of AT and PS/2 drive types
  - High-performance digital separator
  - Supports fast tape drives (2 Mbps) and standard tape drives (1 Mbps, 500 Kbps and 250 Kbps)
- Keyboard and Mouse Controller (KBC)
  - 8-bit microcontroller, software compatible with 8042AH and PC87911
  - Standard interface (60h, 64h, IRQ1 and IRQ12)
  - Supports two external swappable PS/2 interfaces for keyboard and mouse
  - Programmable, dedicated quasi-bidirectional I/O lines (GA20/P21, KBRST/P20)

3.3.4.7 Clocking, Supply, and Package Information

- Clocks
  - LPC (PCI) clock input (up to 33 MHz)

- On-chip Clock Generator:
  - Generates 48 MHz clock
  - Generates 32.768 KHz internal clock
  - VSB3 powered
  - Based on the 14.31818 MHz clock input
- Protection
  - All pins are 5V tolerant and back-drive protected (except LPC bus pins)
  - High ESD protection of all the pins
  - Pin multiplexing selection lock
  - Configuration register lock
- Testability
  - XOR tree structure
    - Includes all the pins (except supply and analog pins)
    - Selected at power-up by strap input (TEST)
  - TRI-STATE pins, selected at power-up by strap input (TRIS)
- Power Supply
  - 3.3V supply operation
  - Separate pin pairs for main (VDD3) and standby (VSB3) power supplies
  - Backup battery input (VBAT) for SWC indications
  - Low standby power consumption
  - Very low power consumption from backup battery (less than 0.5 µA)
- Package 128-pin PQFP

3.4 Motherboard Power Consumption

The motherboard power consumption is highly dependent on the processor, memory and devices attached and also on the software that is running and the power state that the board is in. The figures given below are a guide to the power requirements to expect under selected conditions. They should not be interpreted as maximum requirements. The figures are based on measurements of a real system configured as shown in the following table.

It is recommended that the board be used with a power supply that supports a minimum current load of 0.3A or less on the 5V supply rail and 2A or less on the 3.3V supply rail.

This board with CPU and memory may draw as little as 400mA of 5V and 2A of 3.3V during start-up (increases depend on installed devices). The power supply under consideration must be verified as compatible with the projected total system start-up loads for these supply rails. If the power supply minimum current level requirements are not at or below the level of current loads that are actually drawn, unpredictable start-up operation may result, such as the power supply latching off. If this occurs, the AC input to the power supply must be removed and re-attached or the power supply switch cycled off and on, in order to turn the system back on.

KP915GV

Item	Description
Power Supply	FSP350-60PLN/350W
Current Meter	PROVA CM-01 AC/DC Clamp Meter
Drives	Powered independently
Hard Drive Disk	WD Caviar SE 1200/120GB Serial ATA Disk
Network	On-board (single LAN, not operating)

Configuration 1 : Heavy Load

Item	Description
Memory	Apacer ELPIDA chip DDR2-400 1GB X4 (P/N: 78.01066.420)
Video	On-board (8MB shared Memory)
Network	On-board (single 10/100 LAN, not operating)

Intel Pentium 4 at 3.4GHz with 800MHz Processor Bus

Mode	Motherboard Current (A)						Power
	+3.3V	+5V	+12V	+12V(CPU)	-12V	+5Vsby	Total (W)
MS-DOS Prompt without power management	3.22	1.46	0.32	6.82	0.02	0.05	104.10
Windows XP desktop idle	3.25	1.46	0.32	3.13	0.02	0.04	59.87
Windows XP hibernate (S4)	0.00	0.00	0.00	0.00	0.00	0.41	2.05
Windows XP shutdown	0.00	0.00	0.00	0.00	0.00	0.37	1.85
Windows XP standby (S1)	2.70	1.36	0.30	3.06	0.05	0.02	56.73
Windows XP standby (S3)	0.00	0.00	0.00	0.00	0.00	0.43	2.15
Windows XP stress test (3DMark03)	4.29	2.16	0.52	8.43	0.02	0.05	132.85
Windows XP stress test (PCMark04)	3.58	1.77	0.52	8.77	0.02	0.04	132.58
Windows XP stress test (Intel Maxpower v1.4.2)	3.50	1.67	0.51	10.79	0.03	0.05	156.11

Configuration 2 : Light Load

Item	Description
Memory	Micron MT8HF3264AY-40EB3 256MB DDR2-400 CL3 X1
Video	On-board (8MB shared Memory)
Network	On-board (single LAN, not operating)

Intel Celeron 4 at 2.93GHz with 533MHz Processor Bus

Mode	Motherboard Current (A)						Power
	+3.3V	+5V	+12V	+12V(CPU)	-12V	+5Vsby	Total (W)
MS-DOS Prompt without power management	2.96	0.74	0.32	4.14	0.02	0.05	67.48
Windows XP desktop idle	3.06	0.75	0.35	4.08	0.02	0.05	67.50
Windows XP hibernate (S4)	0.00	0.00	0.00	0.00	0.00	0.41	2.05
Windows XP shutdown	0.00	0.00	0.00	0.00	0.00	0.38	1.90
Windows XP standby (S1)	2.52	0.65	0.33	1.75	0.02	0.05	37.02
Windows XP standby (S3)	0.00	0.00	0.00	0.00	0.00	0.41	2.05
Windows XP stress test (3DMark03)	3.89	1.09	0.35	4.91	0.02	0.05	81.90
Windows XP stress test (PCMark04)	3.17	0.84	0.34	5.00	0.02	0.05	79.23
Windows XP stress test (Intel Maxpower v1.4.2)	3.09	0.77	0.34	6.48	0.02	0.05	96.38

4 Motherboard BIOS

4.1 BIOS Features

- Phoenix Award BIOS
- Intel® Pentium® 4 "Prescott" processor in an LGA775 socket with an 800MHz or 533MHz FSB and microcode patch
- Intel 915GV chipset initialization modules and Intel memory sizing reference code
- Dual channel DDR2 400/533 MHz
  - 4 DDR2 DIMMs with 4GB Maximum capacity
  - Mixed speed DIMM configuration will default to the slowest speed DIMM installed
- NS PC8374K initialization module (supports swappable PS/2 interfaces for keyboard and mouse)
- NS LM96000 CIM initialization module and healthy monitor module
- 4MB FWH flash ROM in PLCC package
- PC2001 compliant
- PCI bus specification v.2.2 compliant
- PCI Express specification Rev. 1.0a compliant
- SMBus 2.0 compliant
- Plug and play specification version 1.0A compliant
- APM 1.2 compliant
- ACPI 2.0 compliant
- SMBIOS 2.3 compliant
- UHCI and EHCI support
  - Fully USB legacy boot
  - USB keyboard/mouse support
- 360K, 720K, 1.2M, 1.44M, 2.88M FDD, LS-120, 120Mbyte floptical drive support
- Enhanced IDE HDD
  - Auto-detect HDD type & access mode (LBA / CHS / Large)
  - Auto detect & Up to PIO mode 4 support
  - Ultra DMA 33/66/100 support
  - INT13 extension support
- BIOS Boot Specification 1.0x compliant
  - Boot from CD-ROM drive (FDD or HDD image - el Torito)
  - Boot from any one of 4 hard drives (C, D, E, F)
  - Boot from SCSI (need SCSI option ROM)
  - Boot from LS-120, IOMEGA ATAPI ZIP drive
  - Boot from network (int18)
- SATA interface support for Legacy IDE, Native IDE, and Enhanced non-AHCI modes
- Setup utility

4.2 Post and Boot

After power-up or reset, the BIOS perform a self-test, POST, that attempts to determine if further operation is possible and that the detected configuration is expected. This process can complete normally or result in a warning or an error. The boot process does not stop after a warning but displays a message on the primary display device. If an error is detected, the boot process is halted. If possible, a message is displayed but failures early on in the test can only be indicated by POST codes.

Once the initial part of the self-test process is completed, the display device is initialized and boot messages can then be sent to the display. By default, the display is in Quietboot mode in which the customizable logo is visible on screen. If the Quietboot mode is disabled (BIOS Setup) then sign-on

and test progress messages are visible. Pressing the 'TAB' key on the keyboard during a Quietboot switches the display to text mode - providing the progress messages.

The BIOS will then search for boot devices in the order configured by the BIOS Setup and load an operating system from the first boot device found. Control is then passed to the operating system and the motherboard BIOS plays no further part in the boot except to provide run-time services.

4.2.1 Hotkeys

Key	Function	Availability
DEL	Enter BIOS Setup	POST
TAB	Switch Quietboot to disable	POST in Quietboot Mode

4.3 Setup Utility

The BIOS Setup utility is provided to perform system configuration changes and to display current settings and environment information. The BIOS Setup utility stores configuration settings in system non-volatile storage. Changes affected by BIOS Setup will not take effect until the system is rebooted.

4.3.1 Enter Setup

During the boot, pressing the 'DEL' key on the keyboard requests the Setup utility be launched once the self-test is complete and before searching for a boot device.

4.3.2 Configuration Reset

Activating the Clear CMOS jumper produces a "reset system configuration" request and the BIOS loads the default system configuration values during the next POST.

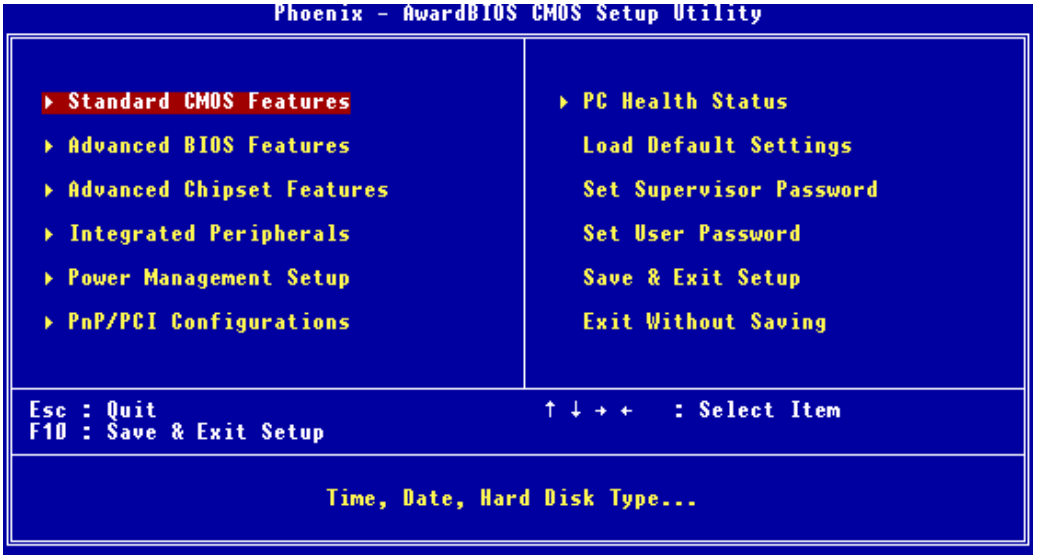
4.3.3 Keyboard Command

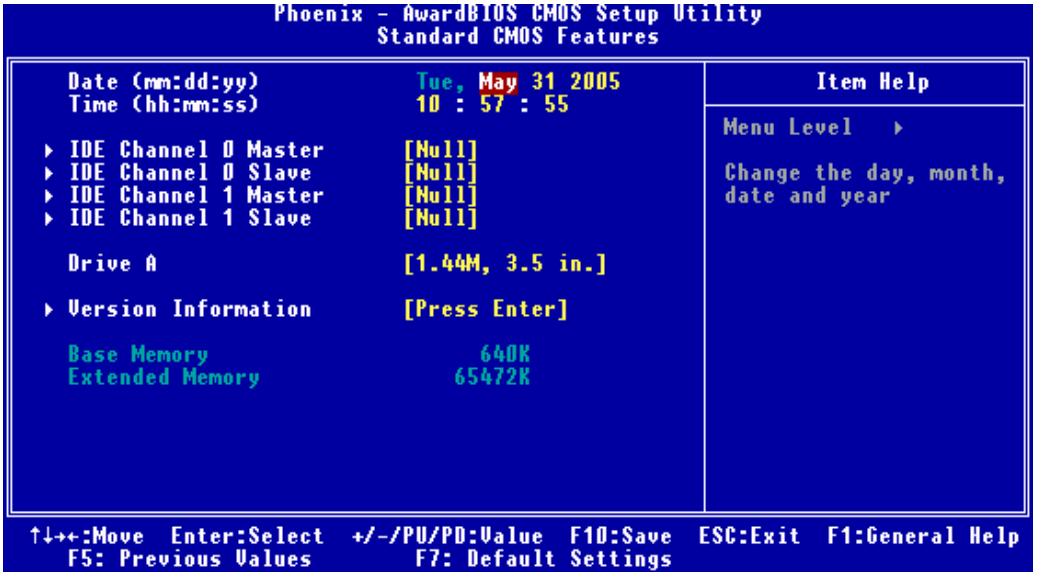
The Keyboard Command Bar supports the following keys:

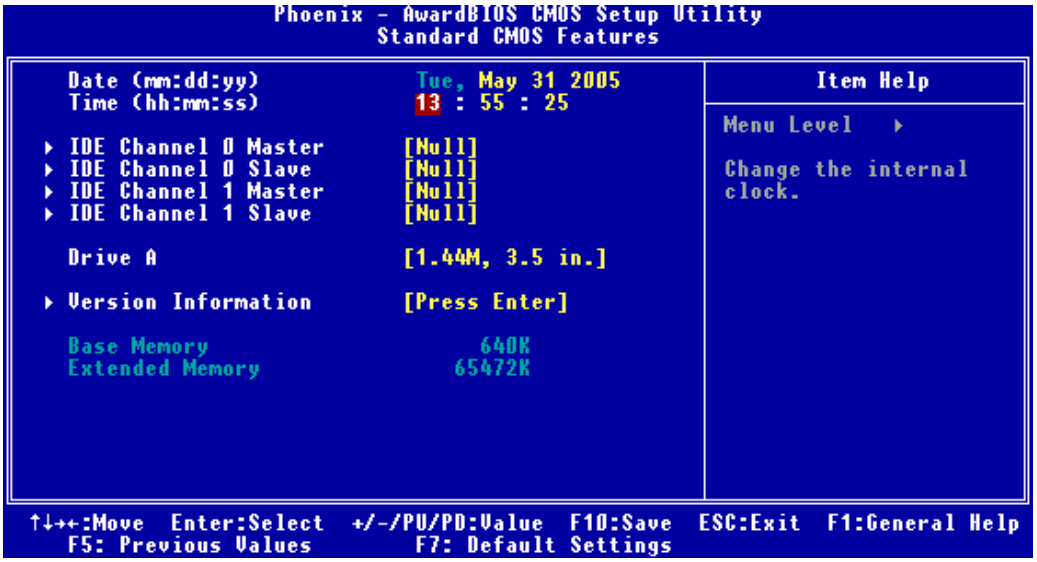
Key	Option	Description
Enter	Execute	The Enter key is used to activate sub-menus, pick lists, or to select a sub-field. If a pick list is displayed, the Enter key will select the pick list highlighted item, and pass that selection in the parent menu.
ESC	Exit	The ESC key provides a mechanism for backing out of any field. This key will undo the pressing of the Enter key. When the ESC key is pressed in any major menu, the exit confirmation window is displayed and the user is asked whether changes can be discarded.
↑↓↔	Select Item	Used to move between the items.
+ - PU PD	Change Value	Used to change options or increase/decrease value.
F1	General Help	Show the help message box.
F5	Previous Values	Used to return to previous value
F7	Default settings	Used to load defaults to Setup items
F10	Save Changes and Exit	Pressing F10 causes a message to appear: If “Yes” is selected and the Enter key is pressed, all changes are saved and setup is exited. If “No” is selected and the Enter key is pressed, or the ESC key is pressed, the user is returned to where they were before F10 was pressed without affecting any existing values.

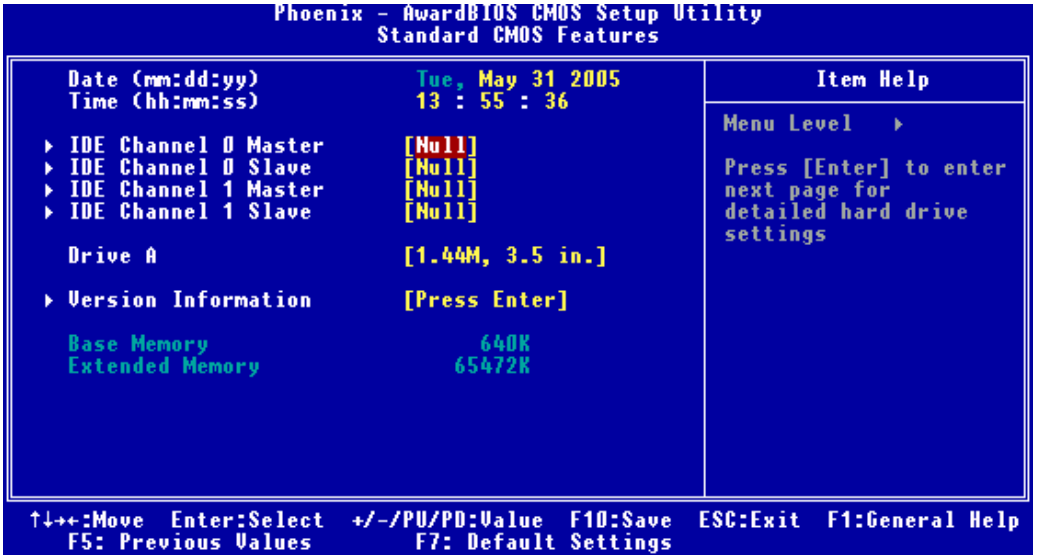
4.3.4 Setup Configuration

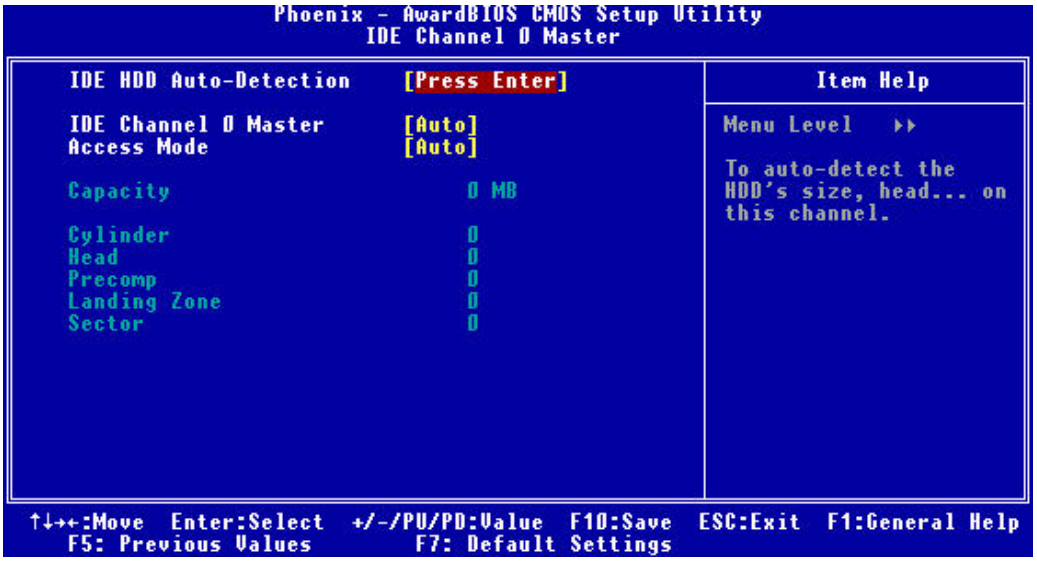
4.3.4.1 Standard CMOS Features

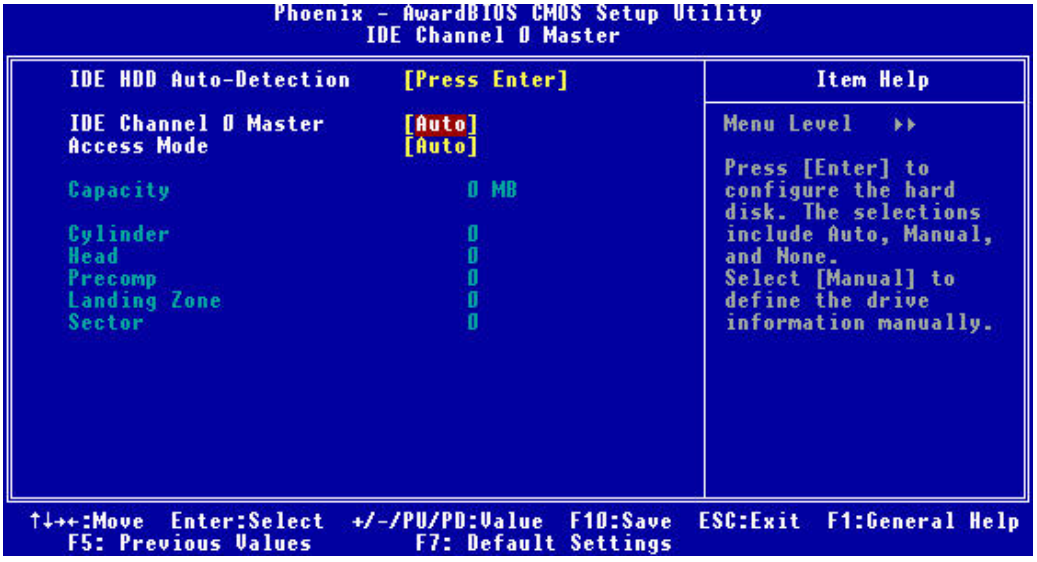


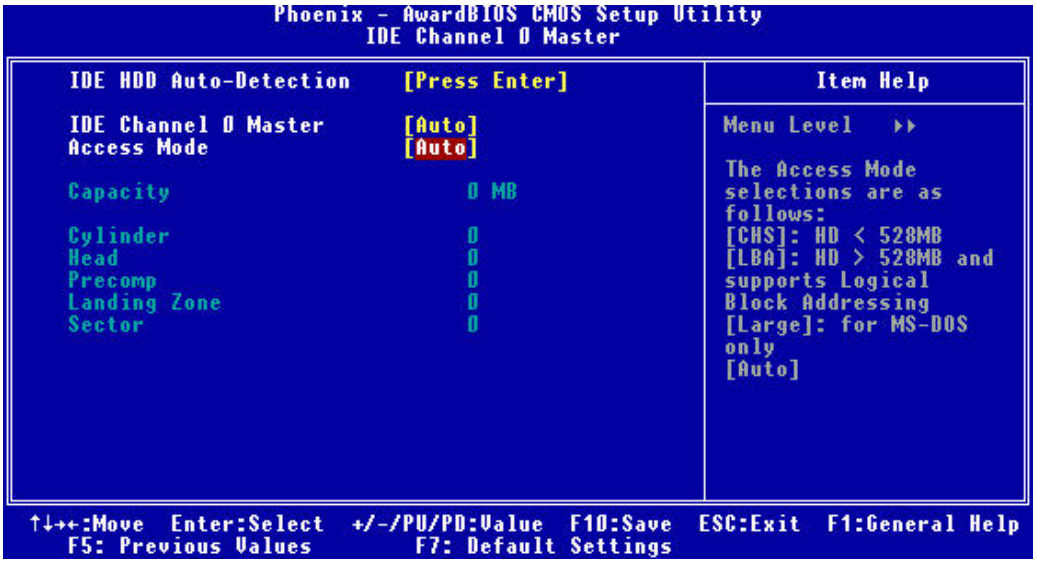

Phoenix - AwardBIOS CMOS Setup Utility
Standard CMOS Features
Date (mm:dd:yy) Tue, May 31 2005
Time (hh:mm:ss) 10 : 57 : 55
IDE Channel 0 Master [Null]
IDE Channel 0 Slave [Null]
IDE Channel 1 Master [Null]
IDE Channel 1 Slave [Null]
Drive A [1.44M, 3.5 in.]
Version Information [Press Enter]
Base Memory 640K
Extended Memory 65472K
Item Help
Menu Level ▸
Change the day, month, date and year
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

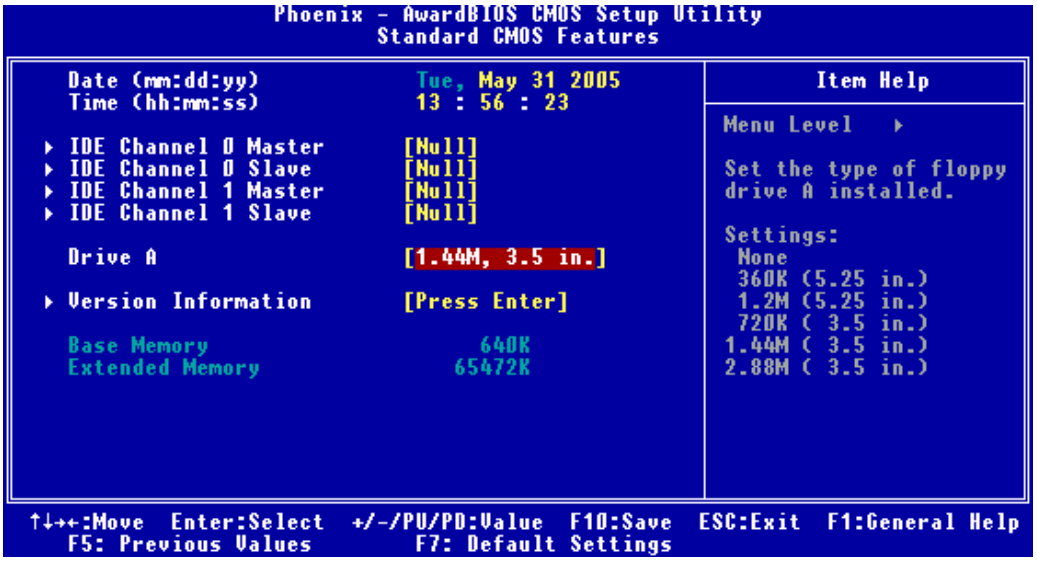

Phoenix - AwardBIOS CMOS Setup Utility
Standard CMOS Features
Date (mm:dd:yy) Tue, May 31 2005
Time (hh:mm:ss) 13 : 55 : 25
IDE Channel 0 Master [Null]
IDE Channel 0 Slave [Null]
IDE Channel 1 Master [Null]
IDE Channel 1 Slave [Null]
Drive A [1.44M, 3.5 in.]
Version Information [Press Enter]
Base Memory 640K
Extended Memory 65472K
Item Help
Menu Level ▸
Change the internal clock.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

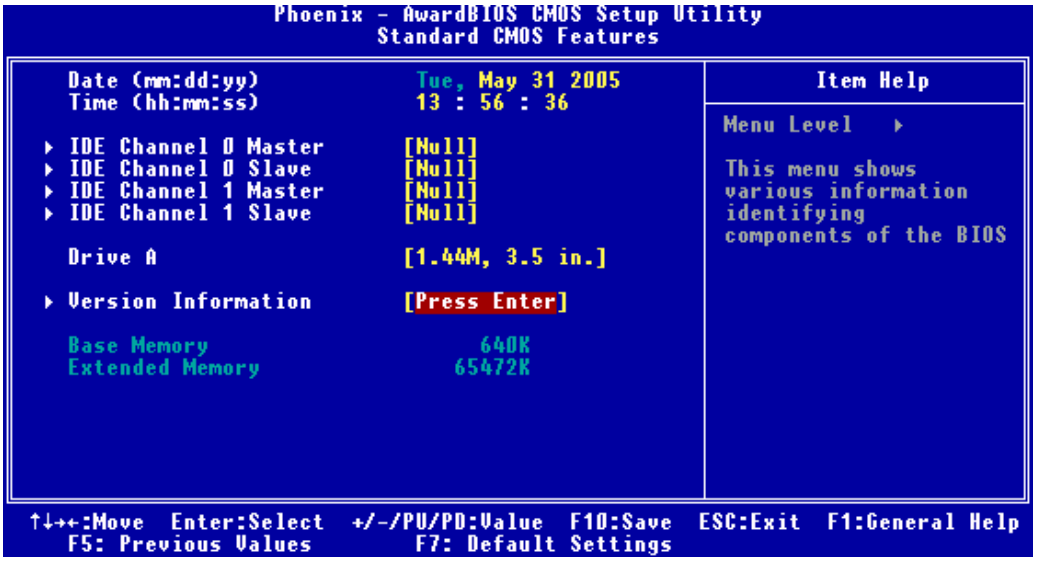

Phoenix - AwardBIOS CMOS Setup Utility
Standard CMOS Features
Date (mm:dd:yy) Tue, May 31 2005
Time (hh:mm:ss) 13 : 55 : 36
IDE Channel 0 Master [Null]
IDE Channel 0 Slave [Null]
IDE Channel 1 Master [Null]
IDE Channel 1 Slave [Null]
Drive A [1.44M, 3.5 in.]
Version Information [Press Enter]
Base Memory 640K
Extended Memory 65472K
Item Help
Menu Level ▸
Press [Enter] to enter next page for detailed hard drive settings
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

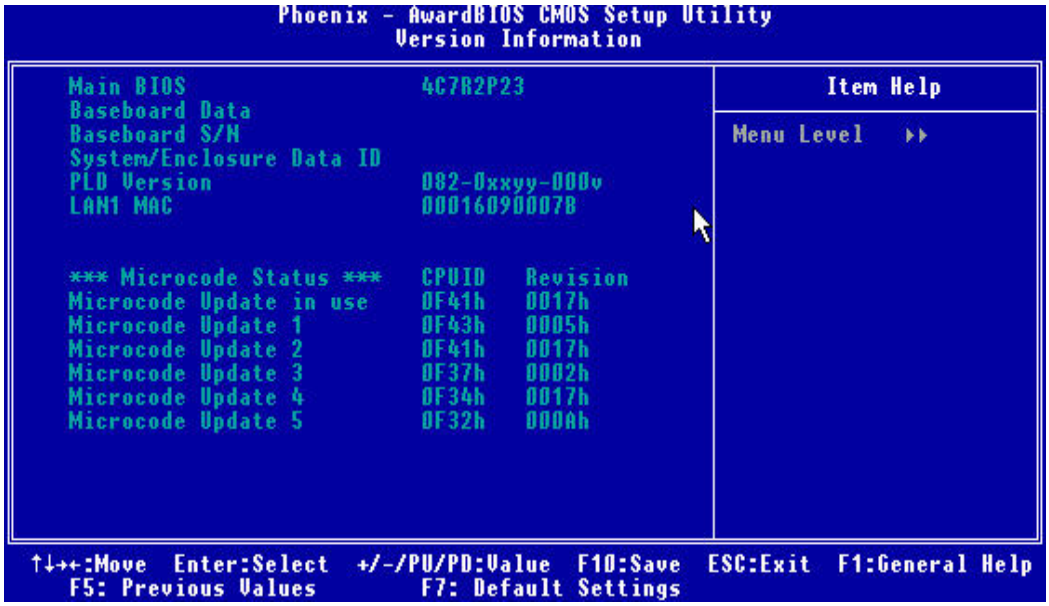

Phoenix - AwardBIOS CMOS Setup Utility
IDE Channel 0 Master
IDE HDD Auto-Detection [Press Enter]
IDE Channel 0 Master [Auto]
Access Mode [Auto]
Capacity 0 MB
Cylinder 0
Head 0
Precomp 0
Landing Zone 0
Sector 0
Item Help
Menu Level ▸▸
To auto-detect the HDD's size, head... on this channel.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings


Phoenix - AwardBIOS CMOS Setup Utility
IDE Channel 0 Master
IDE HDD Auto-Detection [Press Enter]
IDE Channel 0 Master [Auto]
Access Mode [Auto]
Capacity 0 MB
Cylinder 0
Head 0
Precomp 0
Landing Zone 0
Sector 0
Item Help
Menu Level ▸▸
Press [Enter] to configure the hard disk. The selections include Auto, Manual, and None.
Select [Manual] to define the drive information manually.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings


Phoenix - AwardBIOS CMOS Setup Utility
IDE Channel 0 Master
IDE HDD Auto-Detection [Press Enter]
IDE Channel 0 Master [Auto]
Access Mode [Auto]
Capacity 0 MB
Cylinder 0
Head 0
Precomp 0
Landing Zone 0
Sector 0
Item Help
Menu Level ▸▸
The Access Mode selections are as follows:
[CHS]: HD < 528MB
[LBA]: HD > 528MB and supports Logical Block Addressing
[Large]: for MS-DOS only
[Auto]
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

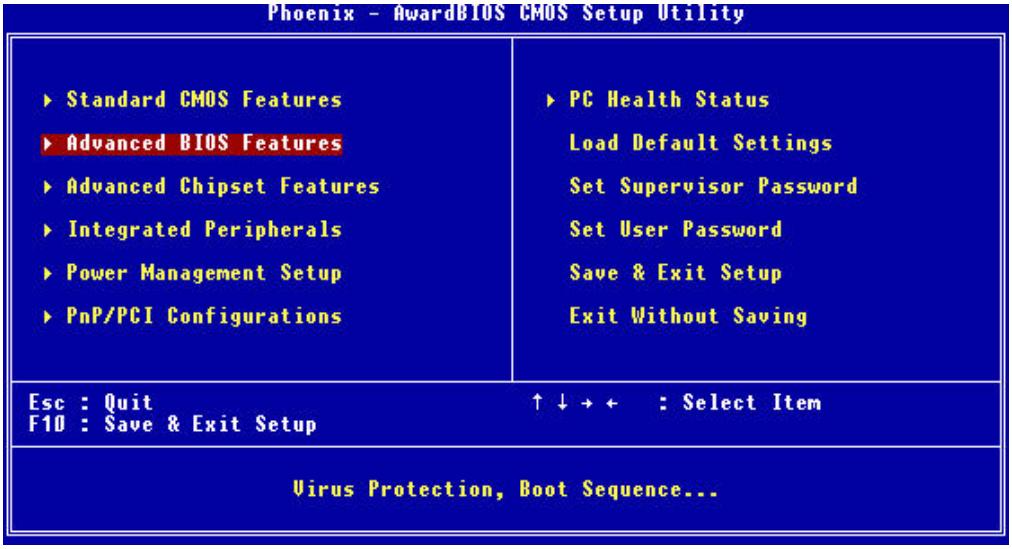

Phoenix - AwardBIOS CMOS Setup Utility
Standard CMOS Features
Date (mm:dd:yy) Tue, May 31 2005
Time (hh:mm:ss) 13 : 56 : 23
▸ IDE Channel 0 Master [Null]
▸ IDE Channel 0 Slave [Null]
▸ IDE Channel 1 Master [Null]
▸ IDE Channel 1 Slave [Null]
Drive A [1.44M, 3.5 in.]
▸ Version Information [Press Enter]
Base Memory 640K
Extended Memory 65472K
Item Help
Menu Level ▸
Set the type of floppy drive A installed.
Settings:
None
360K (5.25 in.)
1.2M (5.25 in.)
720K (3.5 in.)
1.44M (3.5 in.)
2.88M (3.5 in.)
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

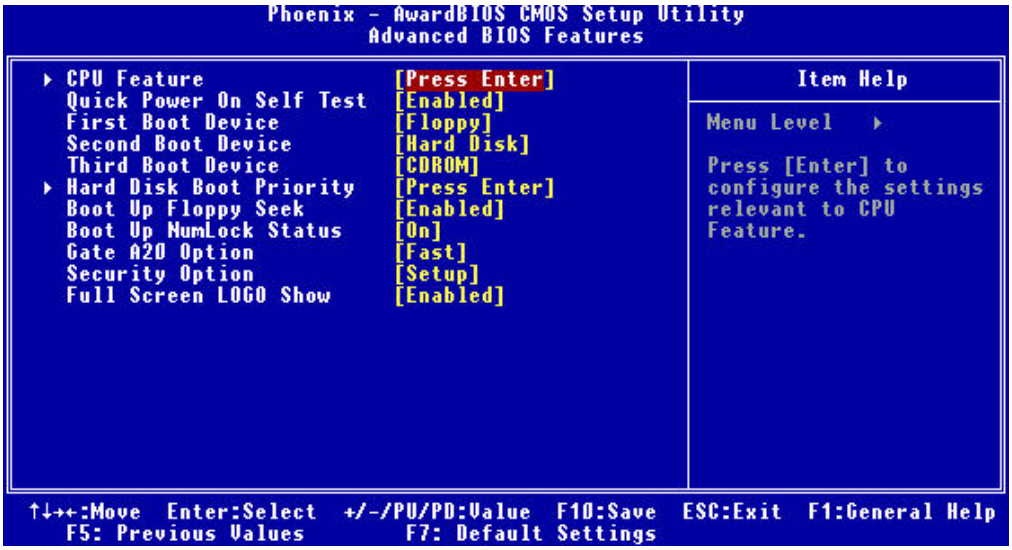

Phoenix - AwardBIOS CMOS Setup Utility
Standard CMOS Features
Date (mm:dd:yy) Tue, May 31 2005
Time (hh:mm:ss) 13 : 56 : 36
IDE Channel 0 Master [Null]
IDE Channel 0 Slave [Null]
IDE Channel 1 Master [Null]
IDE Channel 1 Slave [Null]
Drive A [1.44M, 3.5 in.]
Version Information [Press Enter]
Base Memory 640K
Extended Memory 65472K
Item Help
Menu Level
This menu shows various information identifying components of the BIOS
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

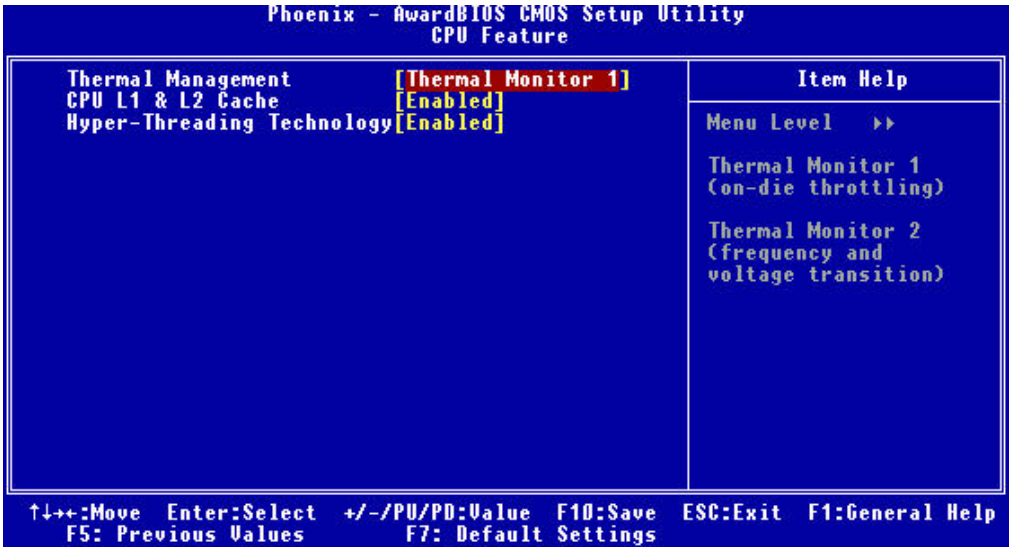

Phoenix - AwardBIOS CMOS Setup Utility
Version Information
Main BIOS 4C7R2P23
Baseboard Data
Baseboard S/N
System/Enclosure Data ID
PLD Version 082-0xxyy-000v
LAN1 MAC 0001609D0078
*** Microcode Status *** CPUID Revision
Microcode Update in use 0F41h 0017h
Microcode Update 1 0F43h 0005h
Microcode Update 2 0F41h 0017h
Microcode Update 3 0F37h 0002h
Microcode Update 4 0F34h 0017h
Microcode Update 5 0F32h 000Ah
Item Help
Menu Level
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

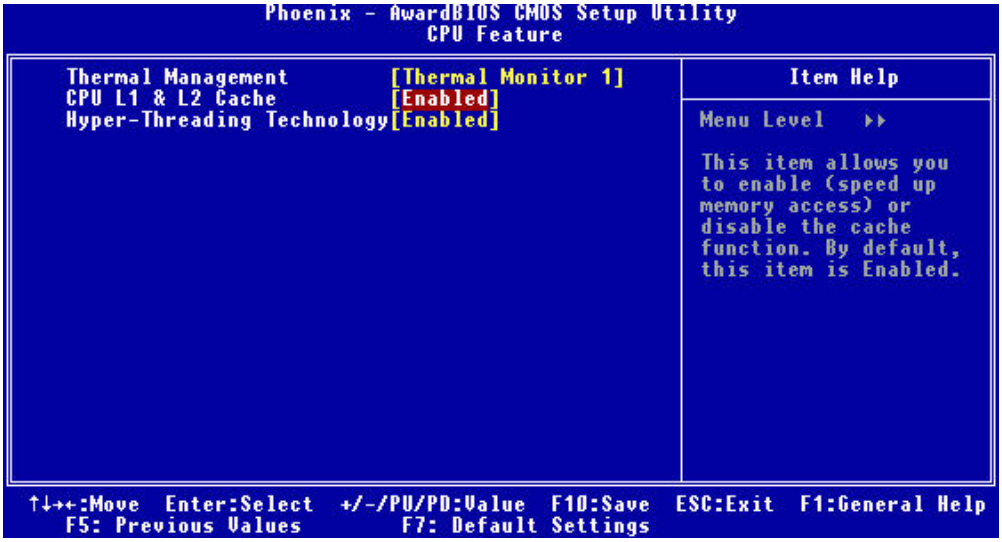
Note: The Main BIOS level in the figure above is an example only and doesn't necessarily reflect the latest BIOS on delivered products or available for downloading.

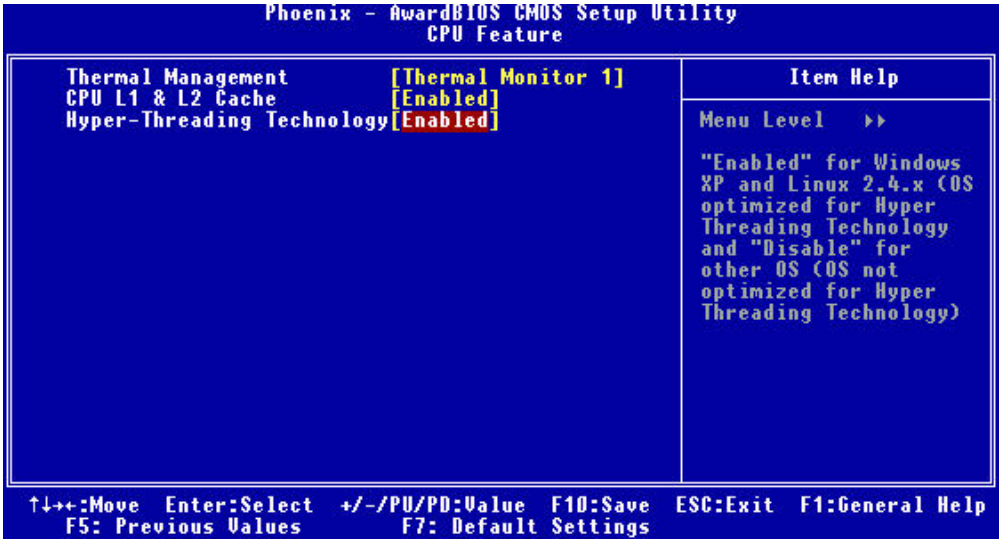
4.3.4.2 Advanced BIOS Features

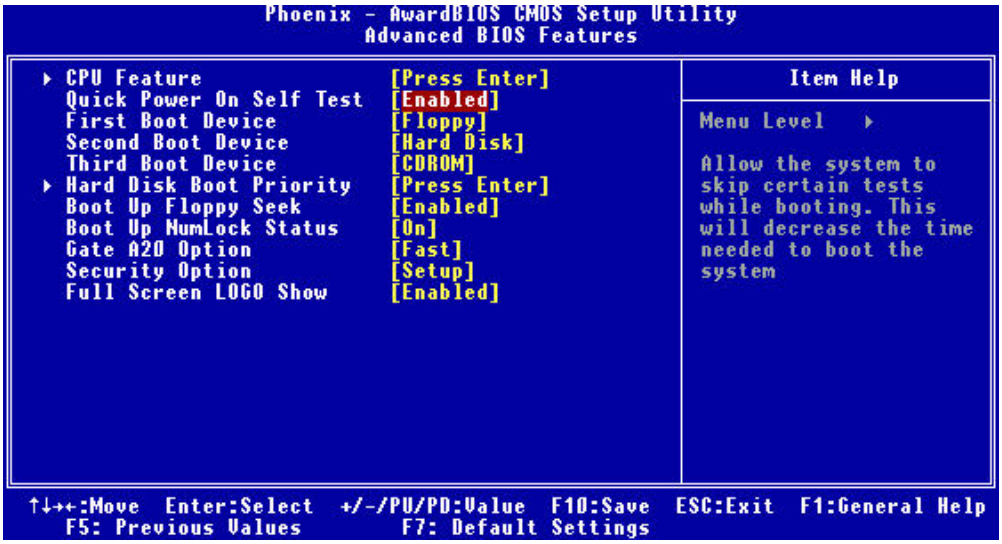

Phoenix - AwardBIOS CMOS Setup Utility
Standard CMOS Features
Advanced BIOS Features
Advanced Chipset Features
Integrated Peripherals
Power Management Setup
PnP/PCI Configurations
PC Health Status
Load Default Settings
Set Supervisor Password
Set User Password
Save & Exit Setup
Exit Without Saving
Esc : Quit
F10 : Save & Exit Setup
↑ ↓ → ← : Select Item
Virus Protection, Boot Sequence...

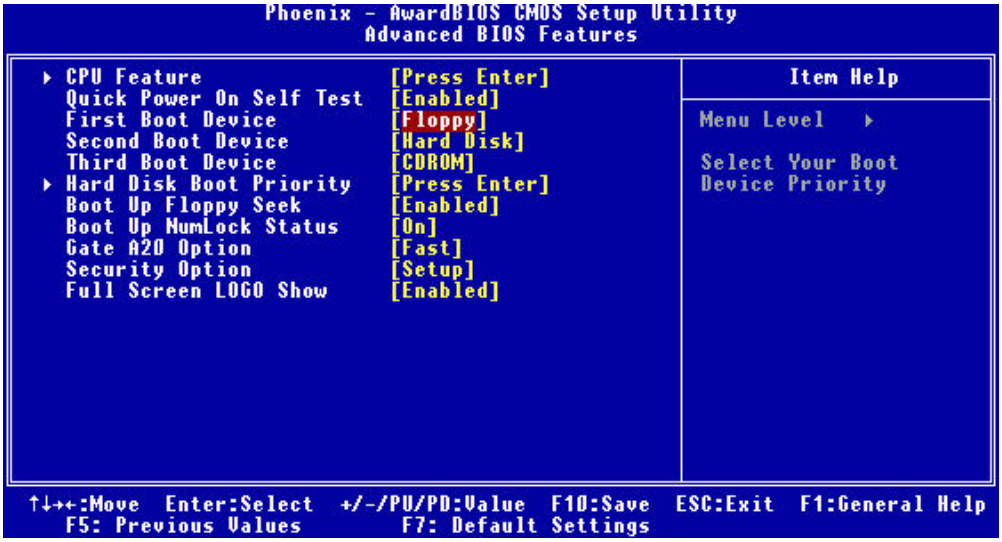

Phoenix - AwardBIOS CMOS Setup Utility
Advanced BIOS Features
CPU Feature [Press Enter]
Quick Power On Self Test [Enabled]
First Boot Device [Floppy]
Second Boot Device [Hard Disk]
Third Boot Device [CDROM]
Hard Disk Boot Priority [Press Enter]
Boot Up Floppy Seek [Enabled]
Boot Up NumLock Status [On]
Gate A20 Option [Fast]
Security Option [Setup]
Full Screen LOGO Show [Enabled]
Item Help
Menu Level ▸
Press [Enter] to configure the settings relevant to CPU Feature.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

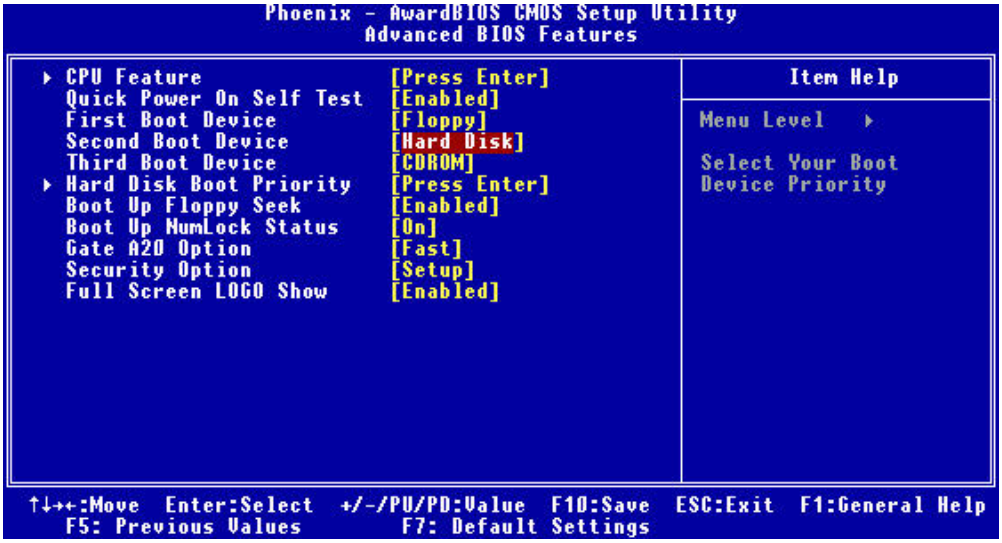

Phoenix - AwardBIOS CMOS Setup Utility
CPU Feature
Thermal Management [Thermal Monitor 1]
CPU L1 & L2 Cache [Enabled]
Hyper-Threading Technology [Enabled]
Item Help
Menu Level ▸▸
Thermal Monitor 1 (on-die throttling)
Thermal Monitor 2 (frequency and voltage transition)
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

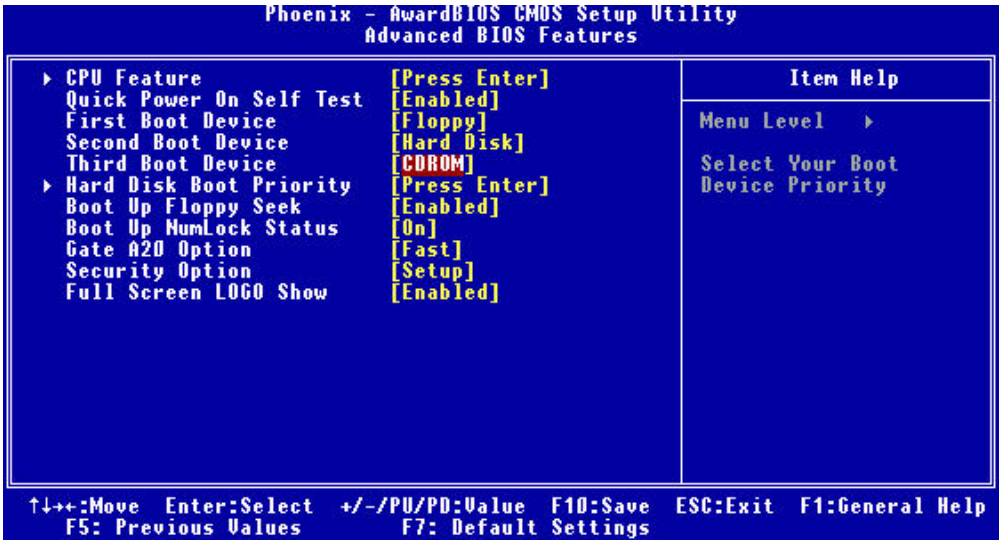

Phoenix - AwardBIOS CMOS Setup Utility
CPU Feature
Thermal Management [Thermal Monitor 1]
CPU L1 & L2 Cache [Enabled]
Hyper-Threading Technology [Enabled]
Item Help
Menu Level ▸▸
This item allows you to enable (speed up memory access) or disable the cache function. By default, this item is Enabled.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

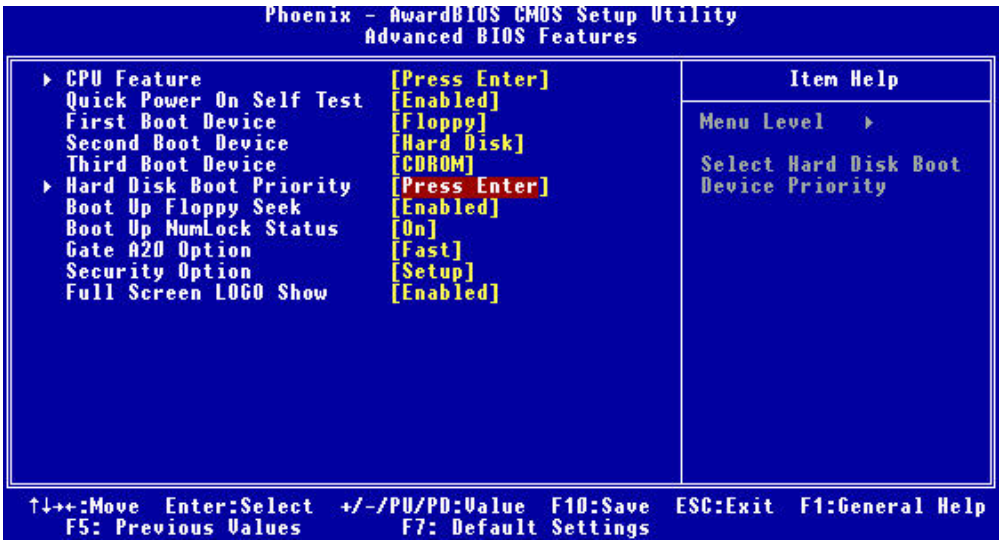

Phoenix - AwardBIOS CMOS Setup Utility
CPU Feature
Thermal Management [Thermal Monitor 1]
CPU L1 & L2 Cache [Enabled]
Hyper-Threading Technology [Enabled]
Item Help
Menu Level ▸▸
"Enabled" for Windows XP and Linux 2.4.x (OS optimized for Hyper Threading Technology and "Disable" for other OS (OS not optimized for Hyper Threading Technology)
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

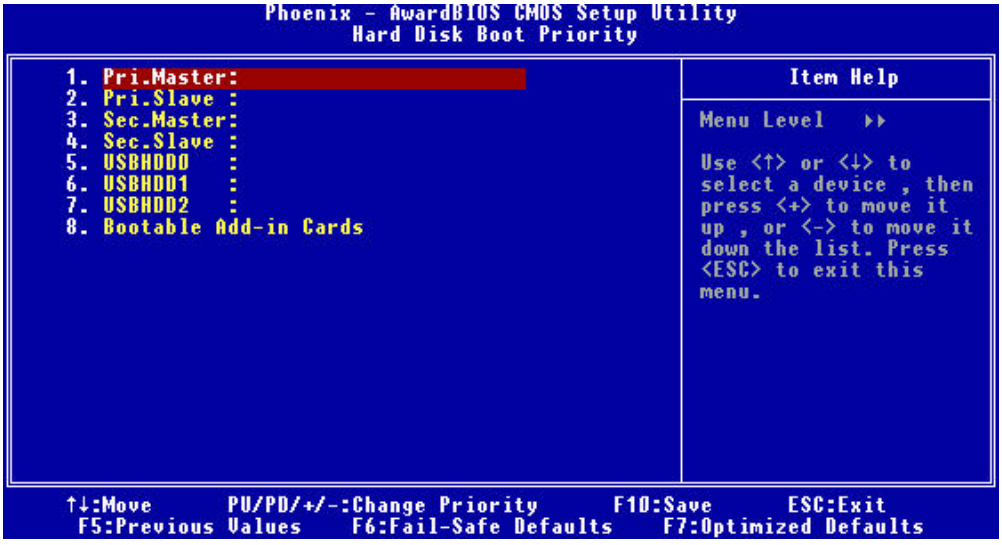

Phoenix - AwardBIOS CMOS Setup Utility
Advanced BIOS Features
▸ CPU Feature [Press Enter]
Quick Power On Self Test [Enabled]
First Boot Device [Floppy]
Second Boot Device [Hard Disk]
Third Boot Device [CDROM]
▸ Hard Disk Boot Priority [Press Enter]
Boot Up Floppy Seek [Enabled]
Boot Up NumLock Status [On]
Gate A20 Option [Fast]
Security Option [Setup]
Full Screen LOGO Show [Enabled]
Item Help
Menu Level ▸
Allow the system to skip certain tests while booting. This will decrease the time needed to boot the system
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

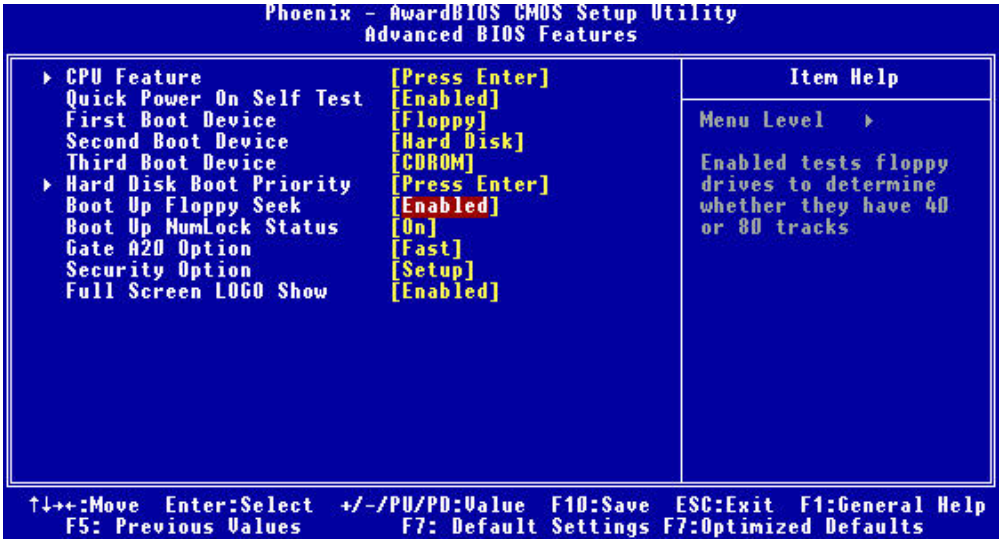

Phoenix - AwardBIOS CMOS Setup Utility
Advanced BIOS Features
CPU Feature [Press Enter]
Quick Power On Self Test [Enabled]
First Boot Device [Floppy]
Second Boot Device [Hard Disk]
Third Boot Device [CDROM]
Hard Disk Boot Priority [Press Enter]
Boot Up Floppy Seek [Enabled]
Boot Up NumLock Status [On]
Gate A20 Option [Fast]
Security Option [Setup]
Full Screen LOGO Show [Enabled]
Item Help
Menu Level
Select Your Boot Device Priority
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

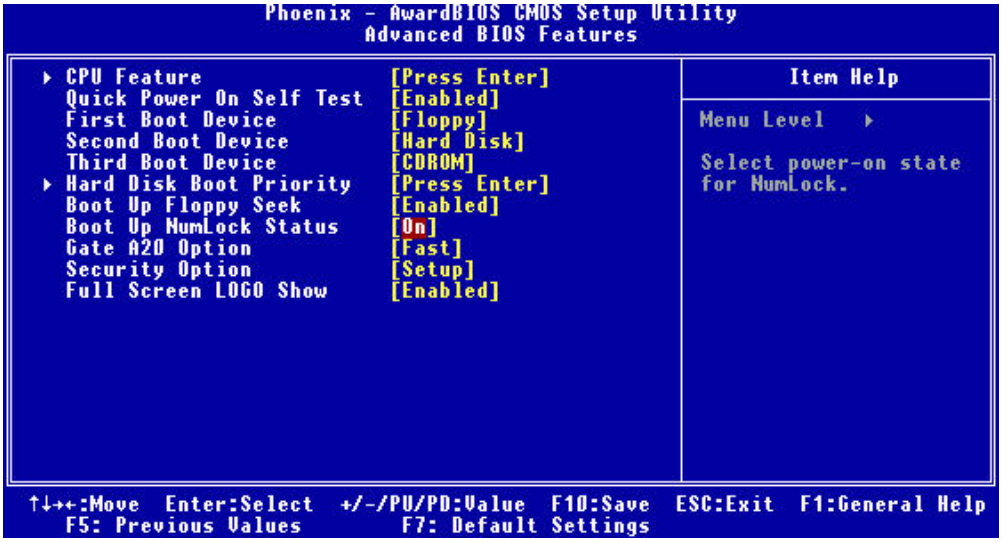

Phoenix - AwardBIOS CMOS Setup Utility
Advanced BIOS Features
CPU Feature [Press Enter]
Quick Power On Self Test [Enabled]
First Boot Device [Floppy]
Second Boot Device [Hard Disk]
Third Boot Device [CDROM]
Hard Disk Boot Priority [Press Enter]
Boot Up Floppy Seek [Enabled]
Boot Up NumLock Status [On]
Gate A20 Option [Fast]
Security Option [Setup]
Full Screen LOGO Show [Enabled]
Item Help
Menu Level
Select Your Boot Device Priority
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

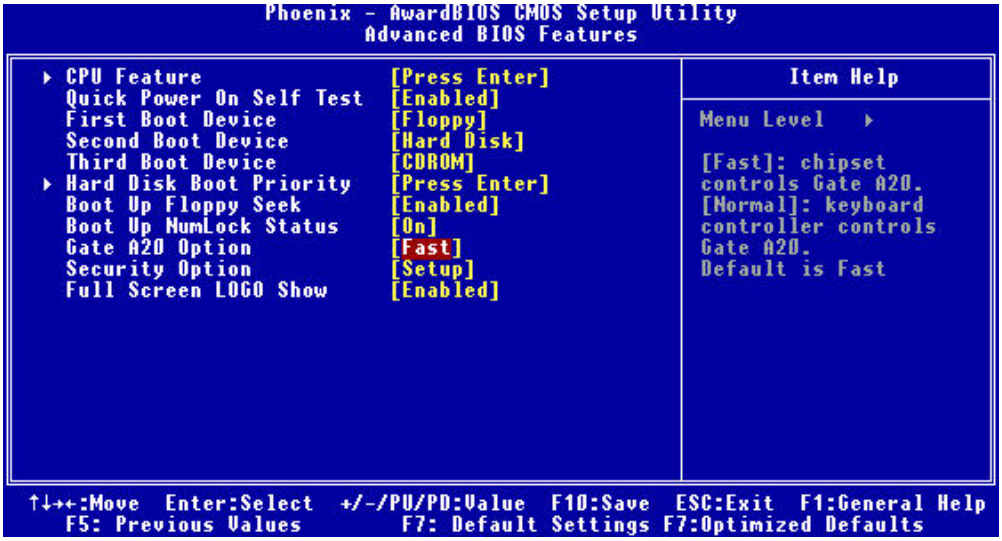

Phoenix - AwardBIOS CMOS Setup Utility
Advanced BIOS Features
CPU Feature [Press Enter]
Quick Power On Self Test [Enabled]
First Boot Device [Floppy]
Second Boot Device [Hard Disk]
Third Boot Device [CDROM]
Hard Disk Boot Priority [Press Enter]
Boot Up Floppy Seek [Enabled]
Boot Up NumLock Status [On]
Gate A20 Option [Fast]
Security Option [Setup]
Full Screen LOGO Show [Enabled]
Item Help
Menu Level
Select Your Boot Device Priority
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

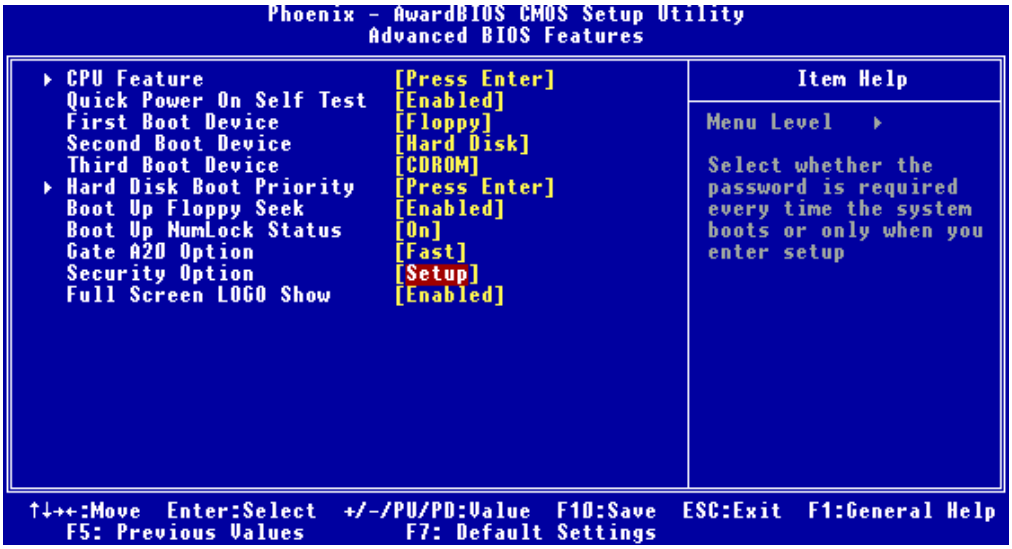

Phoenix - AwardBIOS CMOS Setup Utility
Advanced BIOS Features
CPU Feature [Press Enter]
Quick Power On Self Test [Enabled]
First Boot Device [Floppy]
Second Boot Device [Hard Disk]
Third Boot Device [CDROM]
Hard Disk Boot Priority [Press Enter]
Boot Up Floppy Seek [Enabled]
Boot Up NumLock Status [On]
Gate A20 Option [Fast]
Security Option [Setup]
Full Screen LOGO Show [Enabled]
Item Help
Menu Level ▸
Select Hard Disk Boot Device Priority
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

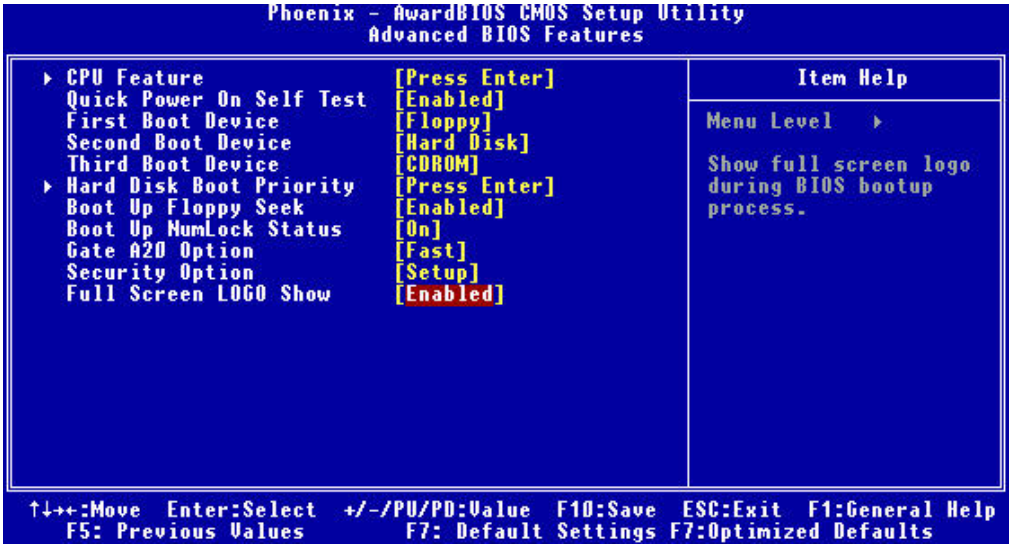

Phoenix - AwardBIOS CMOS Setup Utility
Hard Disk Boot Priority
1. Pri.Master:
2. Pri.Slave :
3. Sec.Master:
4. Sec.Slave :
5. USBHDD0 :
6. USBHDD1 :
7. USBHDD2 :
8. Bootable Add-in Cards
Item Help
Menu Level ▸▸
Use <↑> or <↓> to select a device , then press <+> to move it up , or <-> to move it down the list. Press <ESC> to exit this menu.
↑↓:Move PU/PD/+/-:Change Priority F10:Save ESC:Exit
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults


Phoenix - AwardBIOS CMOS Setup Utility
Advanced BIOS Features
CPU Feature [Press Enter]
Quick Power On Self Test [Enabled]
First Boot Device [Floppy]
Second Boot Device [Hard Disk]
Third Boot Device [CDROM]
Hard Disk Boot Priority [Press Enter]
Boot Up Floppy Seek [Enabled]
Boot Up NumLock Status [On]
Gate A20 Option [Fast]
Security Option [Setup]
Full Screen LOGO Show [Enabled]
Item Help
Menu Level ▸
Enabled tests floppy drives to determine whether they have 40 or 80 tracks
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings F7:Optimized Defaults

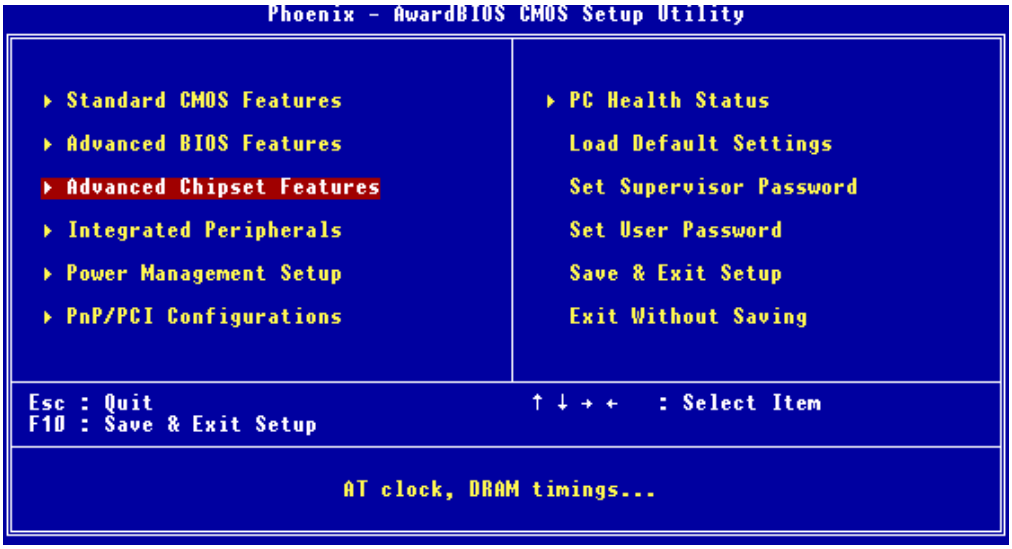

Phoenix - AwardBIOS CMOS Setup Utility
Advanced BIOS Features
CPU Feature [Press Enter]
Quick Power On Self Test [Enabled]
First Boot Device [Floppy]
Second Boot Device [Hard Disk]
Third Boot Device [CDROM]
Hard Disk Boot Priority [Press Enter]
Boot Up Floppy Seek [Enabled]
Boot Up NumLock Status [On]
Gate A20 Option [Fast]
Security Option [Setup]
Full Screen LOGO Show [Enabled]
Item Help
Menu Level
Select power-on state for NumLock.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

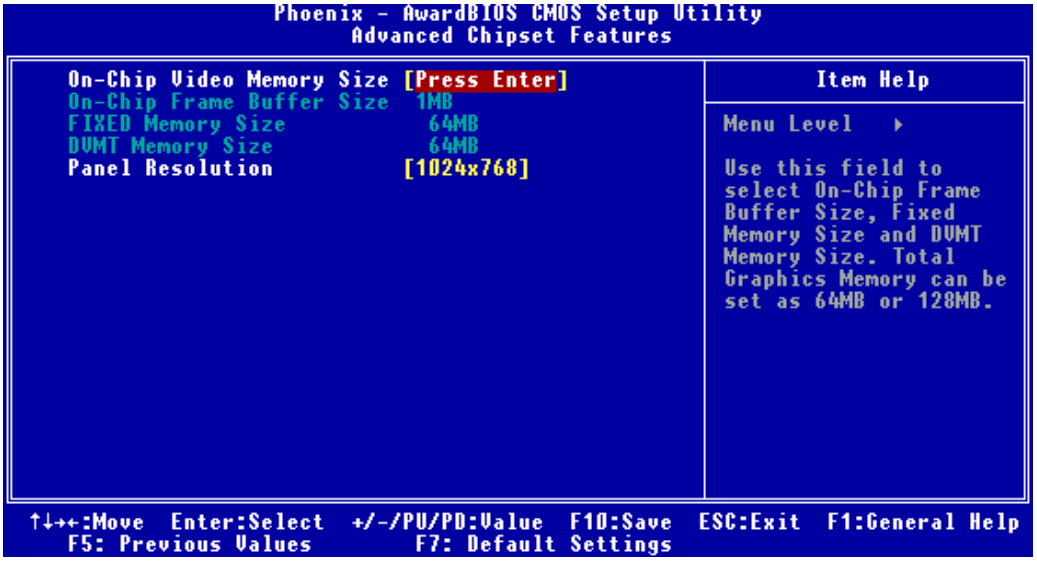

Phoenix - AwardBIOS CMOS Setup Utility
Advanced BIOS Features
CPU Feature [Press Enter]
Quick Power On Self Test [Enabled]
First Boot Device [Floppy]
Second Boot Device [Hard Disk]
Third Boot Device [CDROM]
Hard Disk Boot Priority [Press Enter]
Boot Up Floppy Seek [Enabled]
Boot Up NumLock Status [On]
Gate A20 Option [Fast]
Security Option [Setup]
Full Screen LOGO Show [Enabled]
Item Help
Menu Level
[Fast]: chipset controls Gate A20.
[Normal]: keyboard controller controls Gate A20.
Default is Fast
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings F7:Optimized Defaults

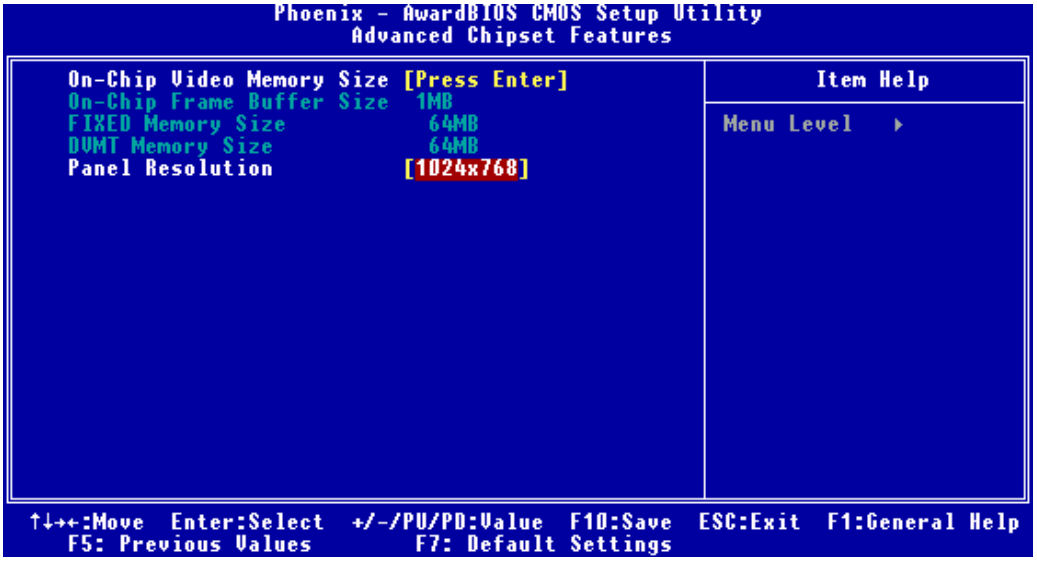

Phoenix - AwardBIOS CMOS Setup Utility
Advanced BIOS Features
CPU Feature [Press Enter]
Quick Power On Self Test [Enabled]
First Boot Device [Floppy]
Second Boot Device [Hard Disk]
Third Boot Device [CDROM]
Hard Disk Boot Priority [Press Enter]
Boot Up Floppy Seek [Enabled]
Boot Up NumLock Status [On]
Gate A20 Option [Fast]
Security Option [Setup]
Full Screen LOGO Show [Enabled]
Item Help
Menu Level
Select whether the password is required every time the system boots or only when you enter setup
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

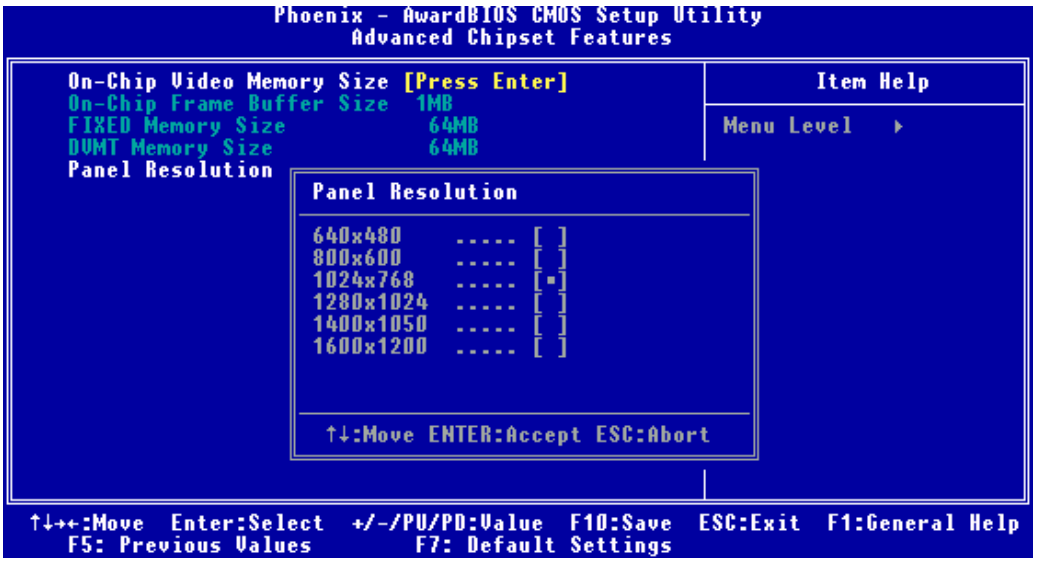

Phoenix - AwardBIOS CMOS Setup Utility
Advanced BIOS Features
CPU Feature [Press Enter]
Quick Power On Self Test [Enabled]
First Boot Device [Floppy]
Second Boot Device [Hard Disk]
Third Boot Device [CDROM]
Hard Disk Boot Priority [Press Enter]
Boot Up Floppy Seek [Enabled]
Boot Up NumLock Status [On]
Gate A20 Option [Fast]
Security Option [Setup]
Full Screen LOGO Show [Enabled]
Item Help
Menu Level
Show full screen logo during BIOS bootup process.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings F7:Optimized Defaults

4.3.4.3 Advanced Chipset Features

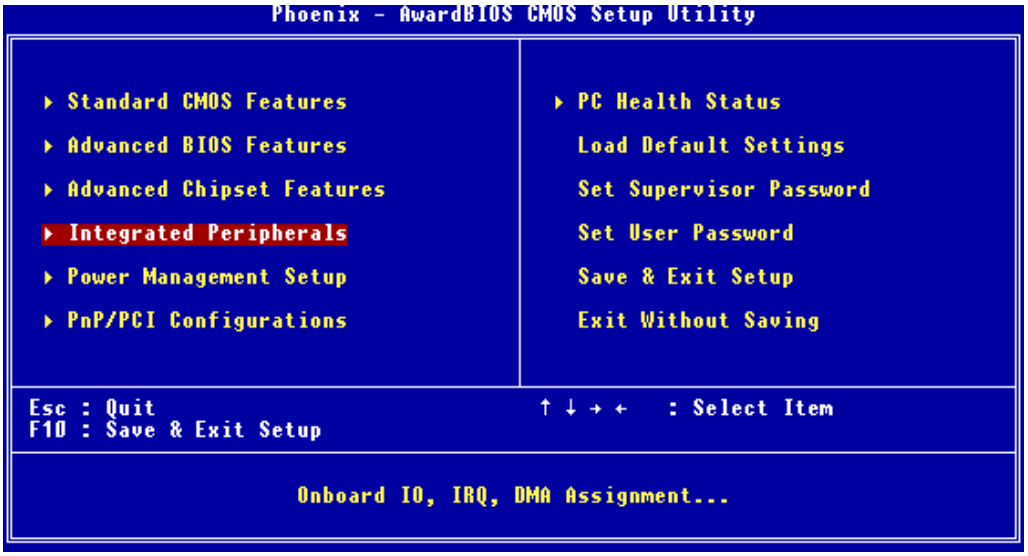

Phoenix - AwardBIOS CMOS Setup Utility
Standard CMOS Features
Advanced BIOS Features
Advanced Chipset Features
Integrated Peripherals
Power Management Setup
PnP/PCI Configurations
PC Health Status
Load Default Settings
Set Supervisor Password
Set User Password
Save & Exit Setup
Exit Without Saving
Esc : Quit
F10 : Save & Exit Setup
↑ ↓ → ← : Select Item
AT clock, DRAM timings...

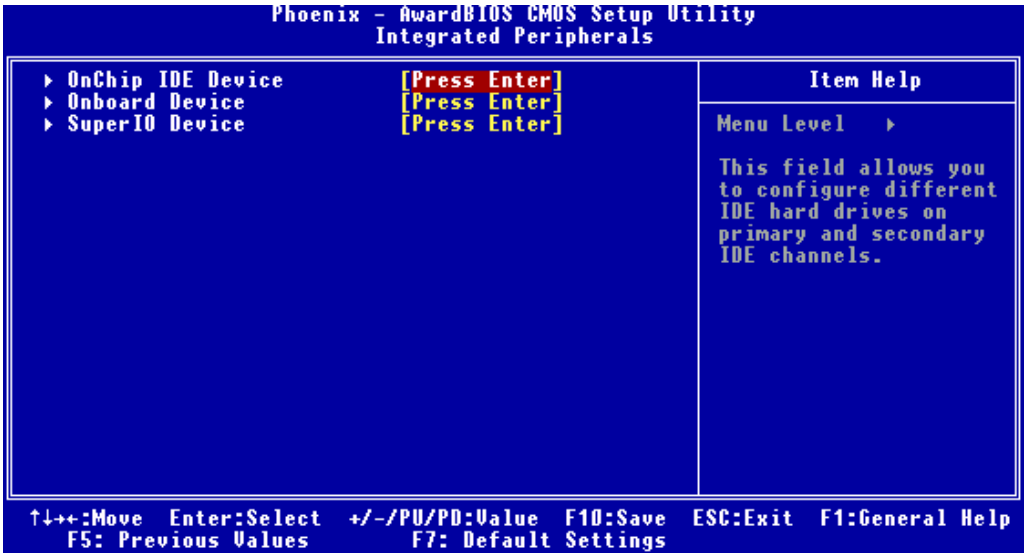

Phoenix - AwardBIOS CMOS Setup Utility
Advanced Chipset Features
On-Chip Video Memory Size [Press Enter]
On-Chip Frame Buffer Size 1MB
FIXED Memory Size 64MB
DVMT Memory Size 64MB
Panel Resolution [1024x768]
Item Help
Menu Level ▸
Use this field to select On-Chip Frame Buffer Size, Fixed Memory Size and DVMT Memory Size. Total Graphics Memory can be set as 64MB or 128MB.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

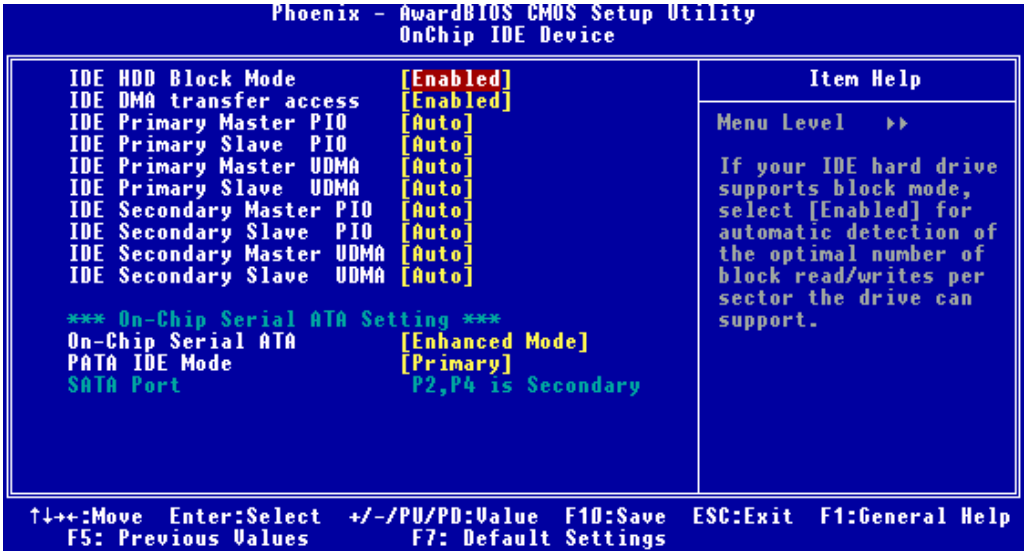

Phoenix - AwardBIOS CMOS Setup Utility
Advanced Chipset Features
On-Chip Video Memory Size [Press Enter]
On-Chip Frame Buffer Size 1MB
FIXED Memory Size 64MB
DVMT Memory Size 64MB
Panel Resolution [1024x768]
Item Help
Menu Level ▸
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

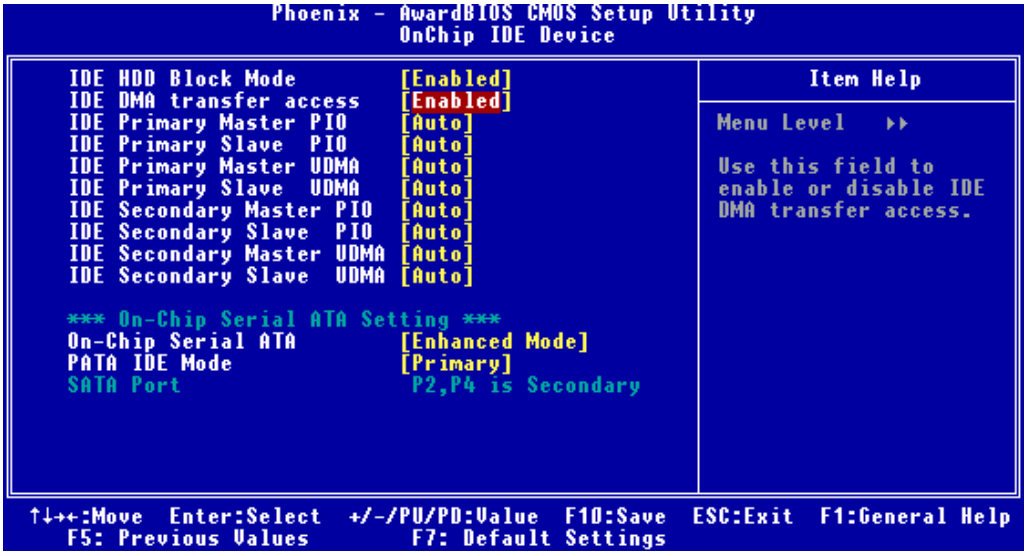

Phoenix - AwardBIOS CMOS Setup Utility
Advanced Chipset Features
On-Chip Video Memory Size [Press Enter]
On-Chip Frame Buffer Size 1MB
FIXED Memory Size 64MB
DVMT Memory Size 64MB
Panel Resolution
Item Help
Menu Level ▸
Panel Resolution
640x480 ..... [ ]
800x600 ..... [ ]
1024x768 ..... [*]
1280x1024 ..... [ ]
1400x1050 ..... [ ]
1600x1200 ..... [ ]
↑↓:Move ENTER:Accept ESC:Abort
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

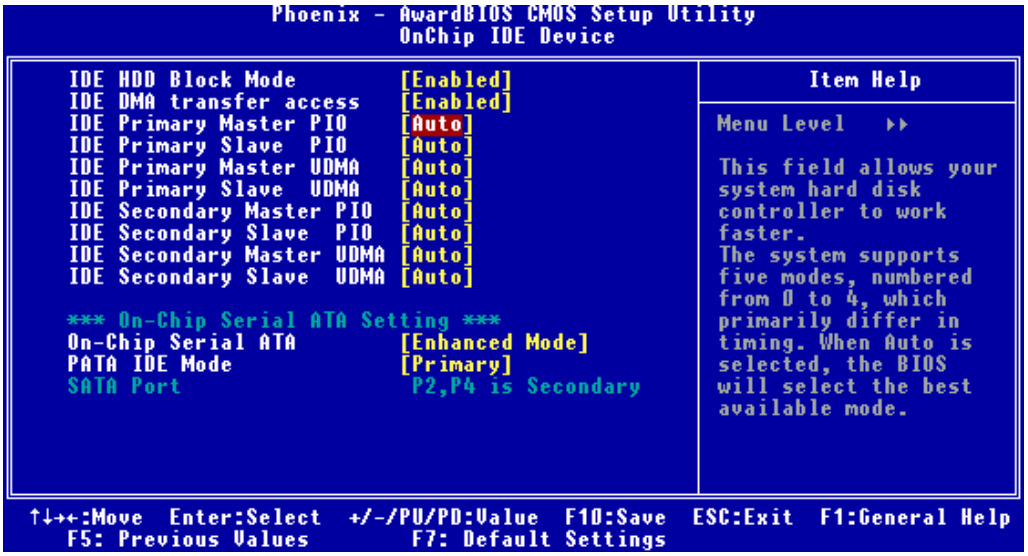
4.3.4.4 Integrated Peripherals

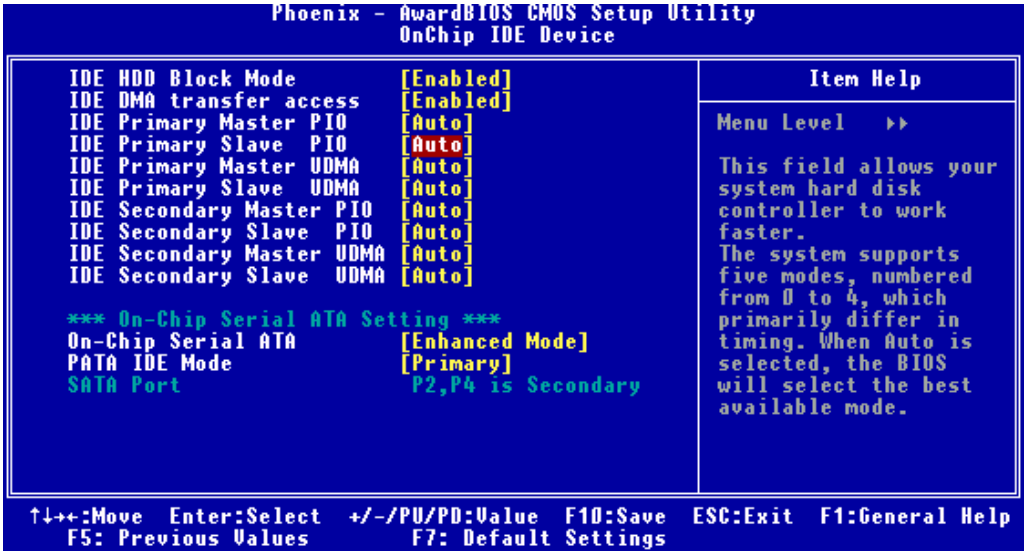

Phoenix - AwardBIOS CMOS Setup Utility
▸ Standard CMOS Features
▸ Advanced BIOS Features
▸ Advanced Chipset Features
▸ Integrated Peripherals
▸ Power Management Setup
▸ PnP/PCI Configurations
▸ PC Health Status
Load Default Settings
Set Supervisor Password
Set User Password
Save & Exit Setup
Exit Without Saving
Esc : Quit
F10 : Save & Exit Setup
↑ ↓ → ← : Select Item
Onboard IO, IRQ, DMA Assignment...

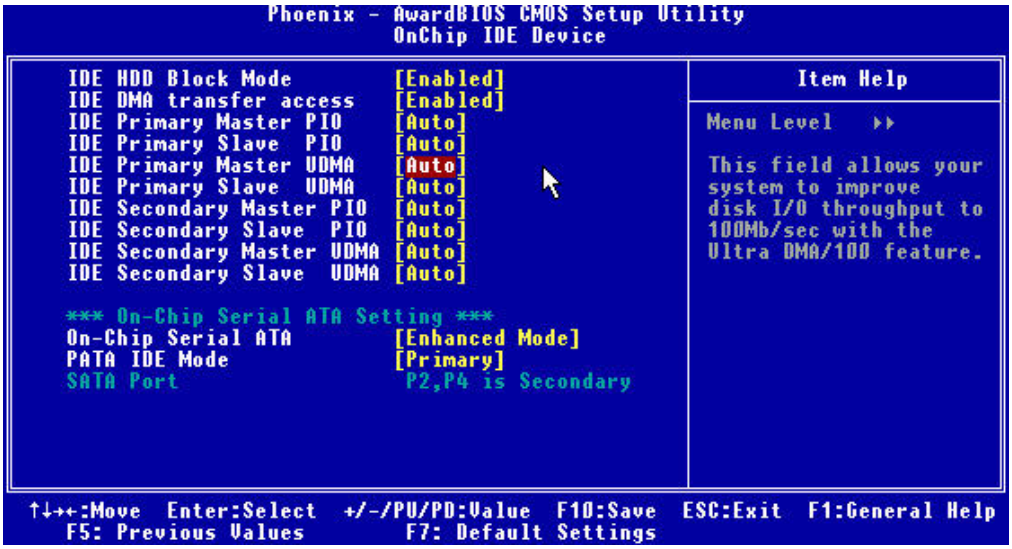

Phoenix - AwardBIOS CMOS Setup Utility
Integrated Peripherals
OnChip IDE Device [Press Enter]
Onboard Device [Press Enter]
SuperIO Device [Press Enter]
Item Help
Menu Level ▸
This field allows you to configure different IDE hard drives on primary and secondary IDE channels.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

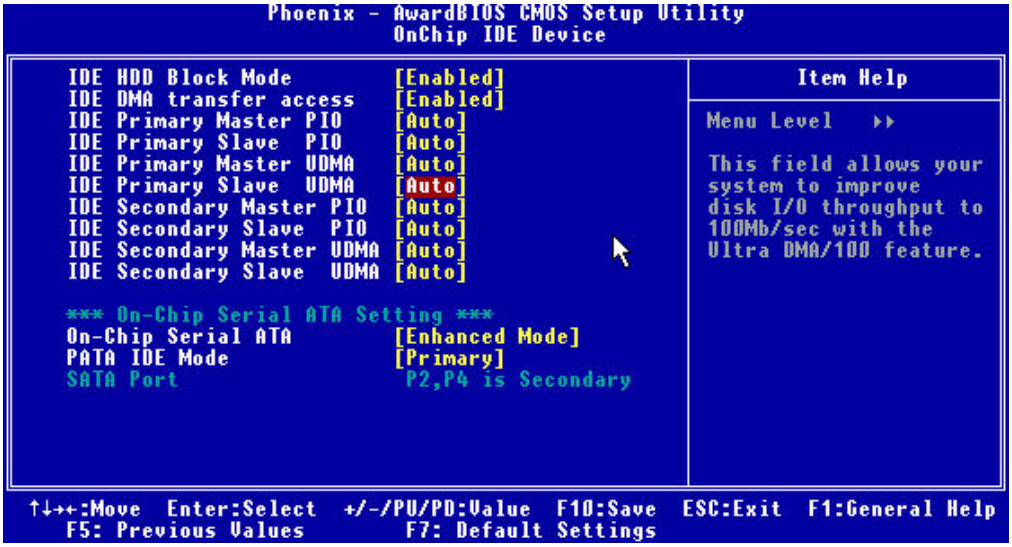

Phoenix - AwardBIOS CMOS Setup Utility
OnChip IDE Device
IDE HDD Block Mode [Enabled]
IDE DMA transfer access [Enabled]
IDE Primary Master PIO [Auto]
IDE Primary Slave PIO [Auto]
IDE Primary Master UDMA [Auto]
IDE Primary Slave UDMA [Auto]
IDE Secondary Master PIO [Auto]
IDE Secondary Slave PIO [Auto]
IDE Secondary Master UDMA [Auto]
IDE Secondary Slave UDMA [Auto]
*** On-Chip Serial ATA Setting ***
On-Chip Serial ATA [Enhanced Mode]
PATA IDE Mode [Primary]
SATA Port P2,P4 is Secondary
Item Help
Menu Level ▸▸
If your IDE hard drive supports block mode, select [Enabled] for automatic detection of the optimal number of block read/writes per sector the drive can support.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

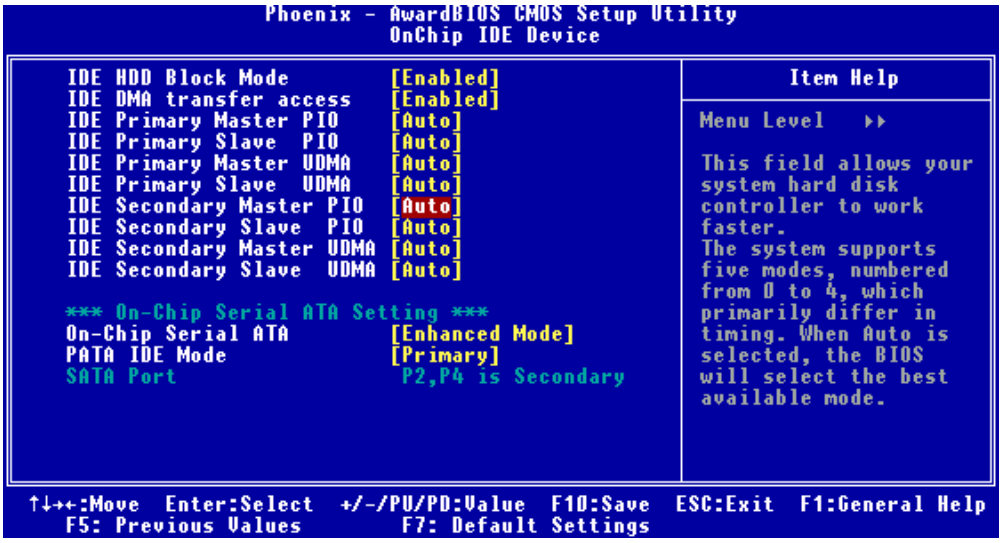

Phoenix - AwardBIOS CMOS Setup Utility
OnChip IDE Device
IDE HDD Block Mode [Enabled]
IDE DMA transfer access [Enabled]
IDE Primary Master PIO [Auto]
IDE Primary Slave PIO [Auto]
IDE Primary Master UDMA [Auto]
IDE Primary Slave UDMA [Auto]
IDE Secondary Master PIO [Auto]
IDE Secondary Slave PIO [Auto]
IDE Secondary Master UDMA [Auto]
IDE Secondary Slave UDMA [Auto]
*** On-Chip Serial ATA Setting ***
On-Chip Serial ATA [Enhanced Mode]
PATA IDE Mode [Primary]
SATA Port P2,P4 is Secondary
Item Help
Menu Level ▸▸
Use this field to enable or disable IDE DMA transfer access.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

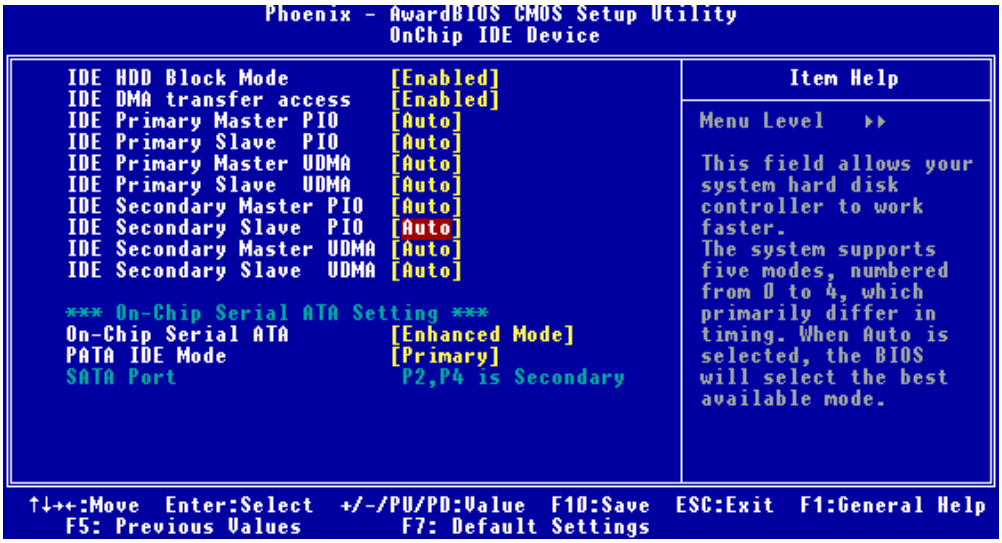

Phoenix - AwardBIOS CMOS Setup Utility
OnChip IDE Device
IDE HDD Block Mode [Enabled]
IDE DMA transfer access [Enabled]
IDE Primary Master PIO [Auto]
IDE Primary Slave PIO [Auto]
IDE Primary Master UDMA [Auto]
IDE Primary Slave UDMA [Auto]
IDE Secondary Master PIO [Auto]
IDE Secondary Slave PIO [Auto]
IDE Secondary Master UDMA [Auto]
IDE Secondary Slave UDMA [Auto]
*** On-Chip Serial ATA Setting ***
On-Chip Serial ATA [Enhanced Mode]
PATA IDE Mode [Primary]
SATA Port P2,P4 is Secondary
Item Help
Menu Level ▸▸
This field allows your system hard disk controller to work faster.
The system supports five modes, numbered from 0 to 4, which primarily differ in timing. When Auto is selected, the BIOS will select the best available mode.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

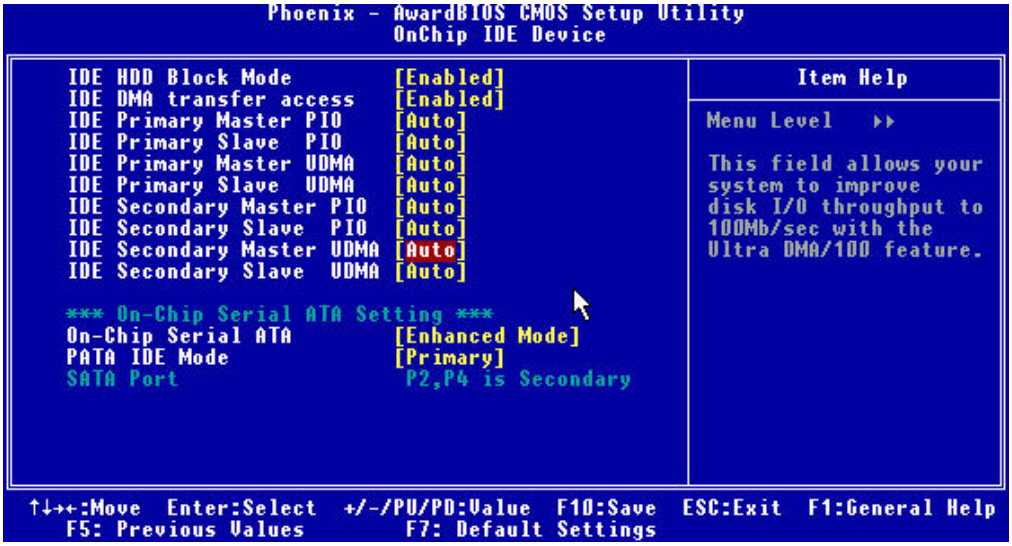

Phoenix - AwardBIOS CMOS Setup Utility
OnChip IDE Device
IDE HDD Block Mode [Enabled]
IDE DMA transfer access [Enabled]
IDE Primary Master PIO [Auto]
IDE Primary Slave PIO [Auto]
IDE Primary Master UDMA [Auto]
IDE Primary Slave UDMA [Auto]
IDE Secondary Master PIO [Auto]
IDE Secondary Slave PIO [Auto]
IDE Secondary Master UDMA [Auto]
IDE Secondary Slave UDMA [Auto]
*** On-Chip Serial ATA Setting ***
On-Chip Serial ATA [Enhanced Mode]
PATA IDE Mode [Primary]
SATA Port P2,P4 is Secondary
Item Help
Menu Level ▸▸
This field allows your system hard disk controller to work faster.
The system supports five modes, numbered from 0 to 4, which primarily differ in timing. When Auto is selected, the BIOS will select the best available mode.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

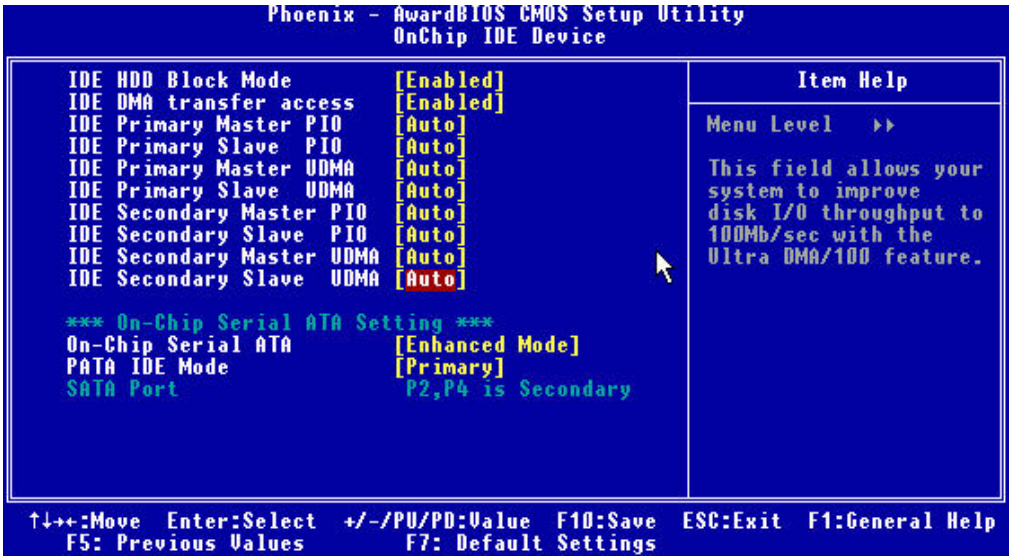

Phoenix - AwardBIOS CMOS Setup Utility
OnChip IDE Device
IDE HDD Block Mode [Enabled]
IDE DMA transfer access [Enabled]
IDE Primary Master PIO [Auto]
IDE Primary Slave PIO [Auto]
IDE Primary Master UDMA [Auto]
IDE Primary Slave UDMA [Auto]
IDE Secondary Master PIO [Auto]
IDE Secondary Slave PIO [Auto]
IDE Secondary Master UDMA [Auto]
IDE Secondary Slave UDMA [Auto]
*** On-Chip Serial ATA Setting ***
On-Chip Serial ATA [Enhanced Mode]
PATA IDE Mode [Primary]
SATA Port P2,P4 is Secondary
Item Help
Menu Level ▸▸
This field allows your system to improve disk I/O throughput to 100Mb/sec with the Ultra DMA/100 feature.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

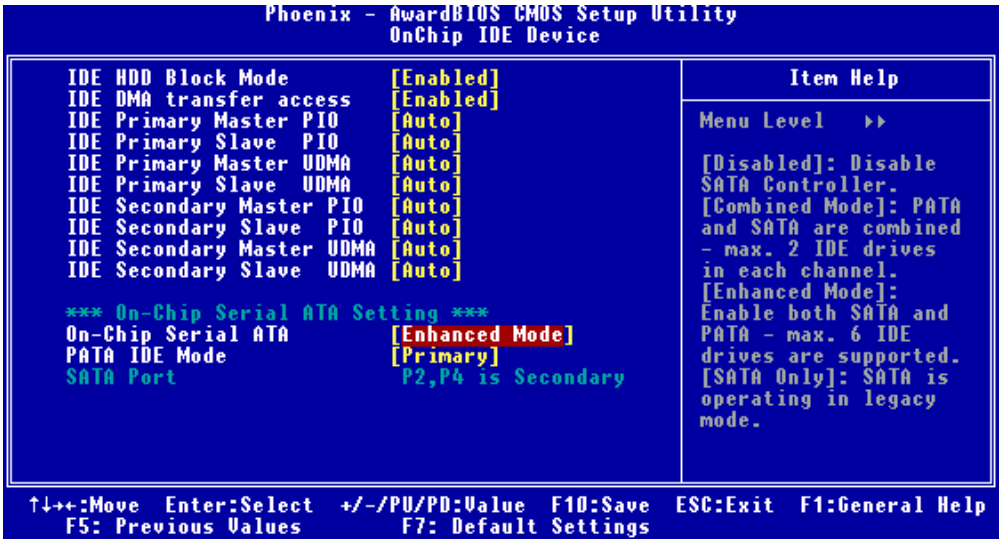

Phoenix - AwardBIOS CMOS Setup Utility
OnChip IDE Device
IDE HDD Block Mode [Enabled]
IDE DMA transfer access [Enabled]
IDE Primary Master PIO [Auto]
IDE Primary Slave PIO [Auto]
IDE Primary Master UDMA [Auto]
IDE Primary Slave UDMA [Auto]
IDE Secondary Master PIO [Auto]
IDE Secondary Slave PIO [Auto]
IDE Secondary Master UDMA [Auto]
IDE Secondary Slave UDMA [Auto]
*** On-Chip Serial ATA Setting ***
On-Chip Serial ATA [Enhanced Mode]
PATA IDE Mode [Primary]
SATA Port P2,P4 is Secondary
Item Help
Menu Level ▸▸
This field allows your system to improve disk I/O throughput to 100Mb/sec with the Ultra DMA/100 feature.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

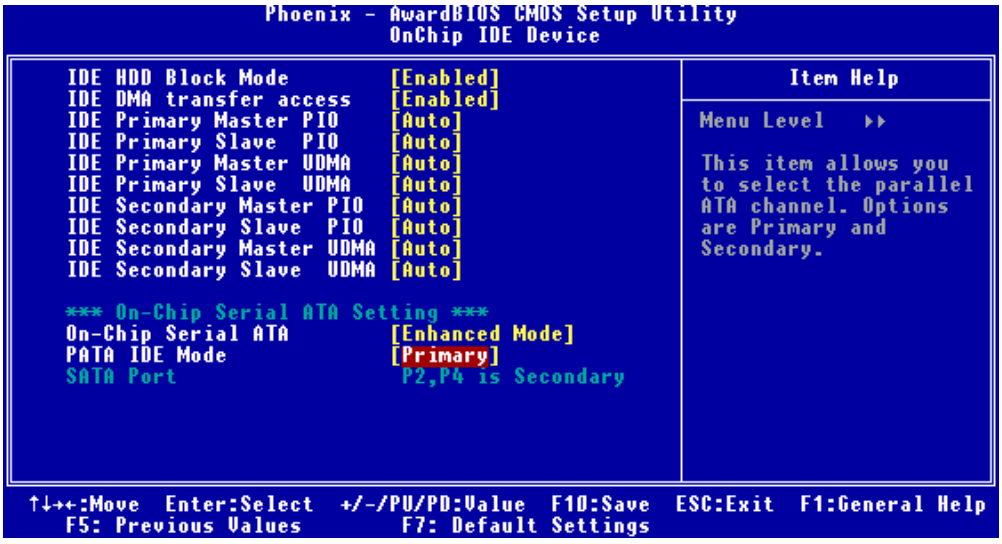

Phoenix - AwardBIOS CMOS Setup Utility
OnChip IDE Device
IDE HDD Block Mode [Enabled]
IDE DMA transfer access [Enabled]
IDE Primary Master PIO [Auto]
IDE Primary Slave PIO [Auto]
IDE Primary Master UDMA [Auto]
IDE Primary Slave UDMA [Auto]
IDE Secondary Master PIO [Auto]
IDE Secondary Slave PIO [Auto]
IDE Secondary Master UDMA [Auto]
IDE Secondary Slave UDMA [Auto]
*** On-Chip Serial ATA Setting ***
On-Chip Serial ATA [Enhanced Mode]
PATA IDE Mode [Primary]
SATA Port P2,P4 is Secondary
Item Help
Menu Level ▸▸
This field allows your system hard disk controller to work faster.
The system supports five modes, numbered from 0 to 4, which primarily differ in timing. When Auto is selected, the BIOS will select the best available mode.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

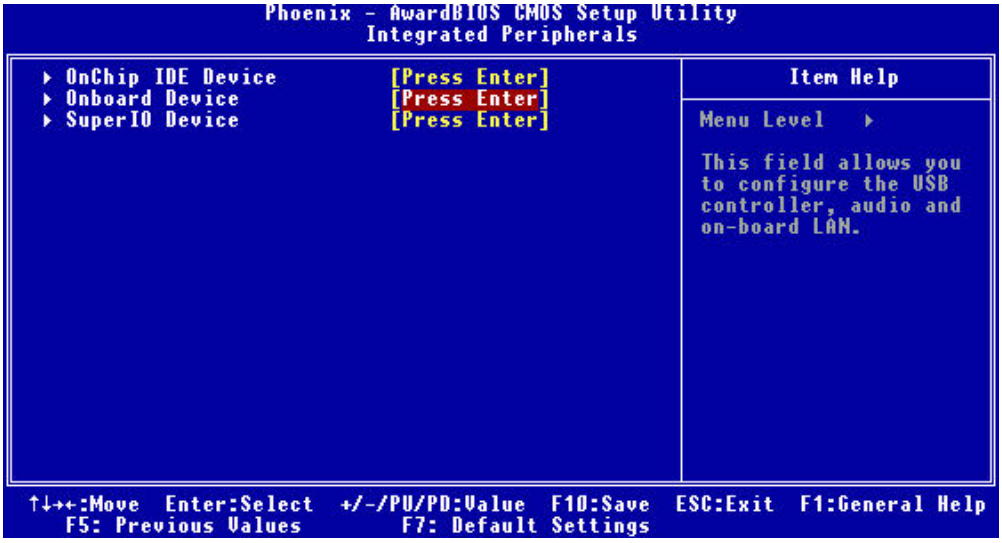

Phoenix - AwardBIOS CMOS Setup Utility
OnChip IDE Device
IDE HDD Block Mode [Enabled]
IDE DMA transfer access [Enabled]
IDE Primary Master PIO [Auto]
IDE Primary Slave PIO [Auto]
IDE Primary Master UDMA [Auto]
IDE Primary Slave UDMA [Auto]
IDE Secondary Master PIO [Auto]
IDE Secondary Slave PIO [Auto]
IDE Secondary Master UDMA [Auto]
IDE Secondary Slave UDMA [Auto]
*** On-Chip Serial ATA Setting ***
On-Chip Serial ATA [Enhanced Mode]
PATA IDE Mode [Primary]
SATA Port P2,P4 is Secondary
Item Help
Menu Level ▸▸
This field allows your system hard disk controller to work faster.
The system supports five modes, numbered from 0 to 4, which primarily differ in timing. When Auto is selected, the BIOS will select the best available mode.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

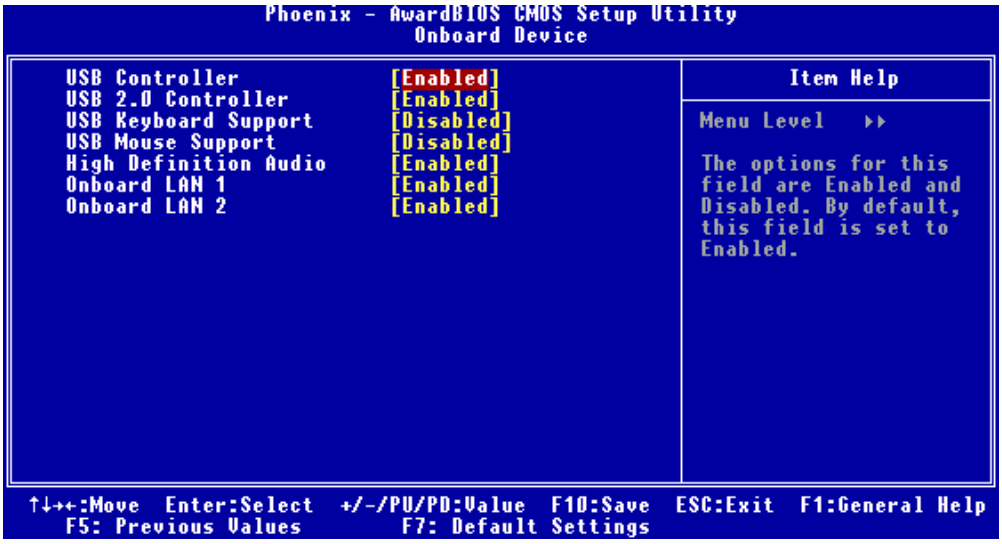

Phoenix - AwardBIOS CMOS Setup Utility
OnChip IDE Device
IDE HDD Block Mode [Enabled]
IDE DMA transfer access [Enabled]
IDE Primary Master PIO [Auto]
IDE Primary Slave PIO [Auto]
IDE Primary Master UDMA [Auto]
IDE Primary Slave UDMA [Auto]
IDE Secondary Master PIO [Auto]
IDE Secondary Slave PIO [Auto]
IDE Secondary Master UDMA [Auto]
IDE Secondary Slave UDMA [Auto]
*** On-Chip Serial ATA Setting ***
On-Chip Serial ATA [Enhanced Mode]
PATA IDE Mode [Primary]
SATA Port P2,P4 is Secondary
Item Help
Menu Level ▸▸
This field allows your system to improve disk I/O throughput to 100Mb/sec with the Ultra DMA/100 feature.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

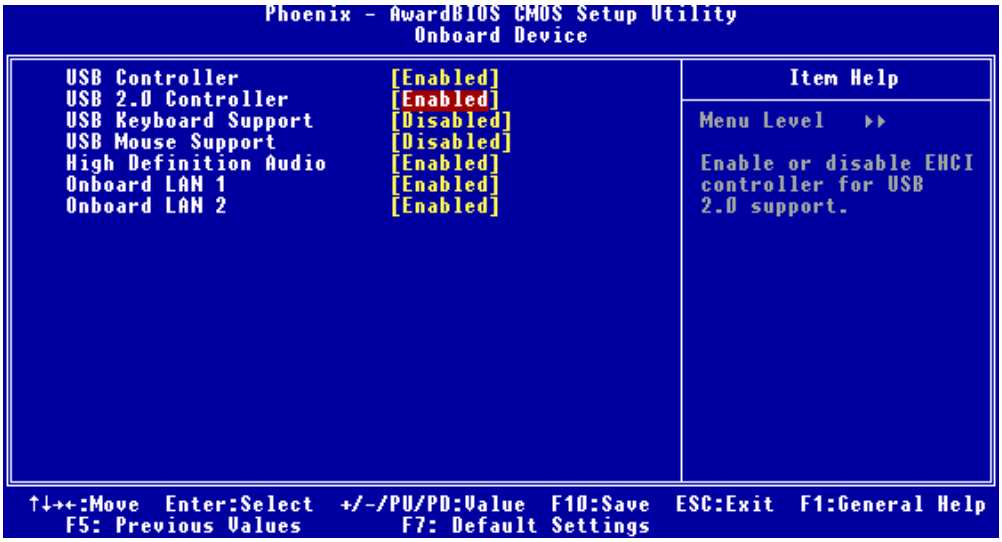

Phoenix - AwardBIOS CMOS Setup Utility
OnChip IDE Device
IDE HDD Block Mode [Enabled]
IDE DMA transfer access [Enabled]
IDE Primary Master PIO [Auto]
IDE Primary Slave PIO [Auto]
IDE Primary Master UDMA [Auto]
IDE Primary Slave UDMA [Auto]
IDE Secondary Master PIO [Auto]
IDE Secondary Slave PIO [Auto]
IDE Secondary Master UDMA [Auto]
IDE Secondary Slave UDMA [Auto]
*** On-Chip Serial ATA Setting ***
On-Chip Serial ATA [Enhanced Mode]
PATA IDE Mode [Primary]
SATA Port P2,P4 is Secondary
Item Help
Menu Level ▸▸
This field allows your system to improve disk I/O throughput to 100Mb/sec with the Ultra DMA/100 feature.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

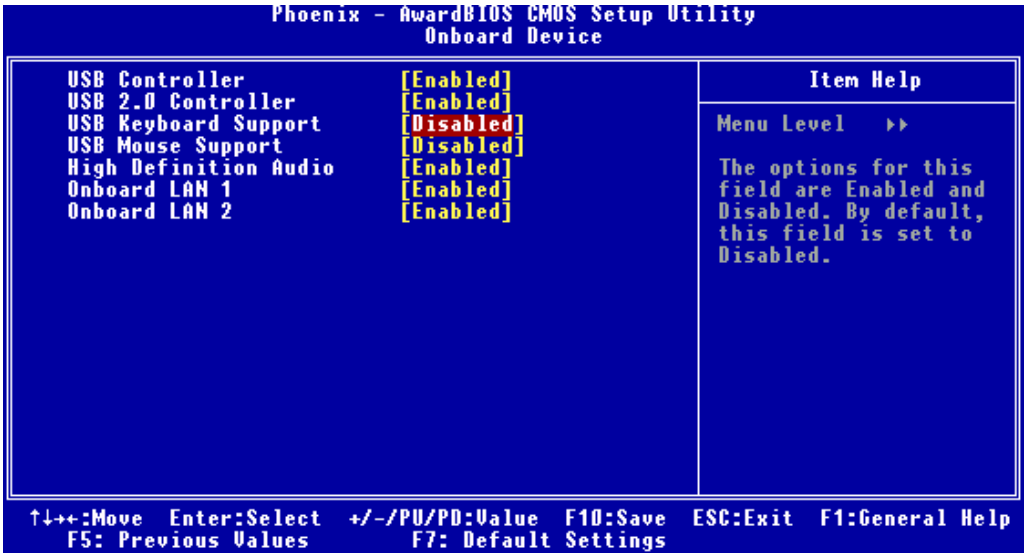

Phoenix - AwardBIOS CMOS Setup Utility
OnChip IDE Device
IDE HDD Block Mode [Enabled]
IDE DMA transfer access [Enabled]
IDE Primary Master PIO [Auto]
IDE Primary Slave PIO [Auto]
IDE Primary Master UDMA [Auto]
IDE Primary Slave UDMA [Auto]
IDE Secondary Master PIO [Auto]
IDE Secondary Slave PIO [Auto]
IDE Secondary Master UDMA [Auto]
IDE Secondary Slave UDMA [Auto]
*** On-Chip Serial ATA Setting ***
On-Chip Serial ATA [Enhanced Mode]
PATA IDE Mode [Primary]
SATA Port P2,P4 is Secondary
Item Help
Menu Level ▸▸
[Disabled]: Disable SATA Controller.
[Combined Mode]: PATA and SATA are combined - max. 2 IDE drives in each channel.
[Enhanced Mode]: Enable both SATA and PATA - max. 6 IDE drives are supported.
[SATA Only]: SATA is operating in legacy mode.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

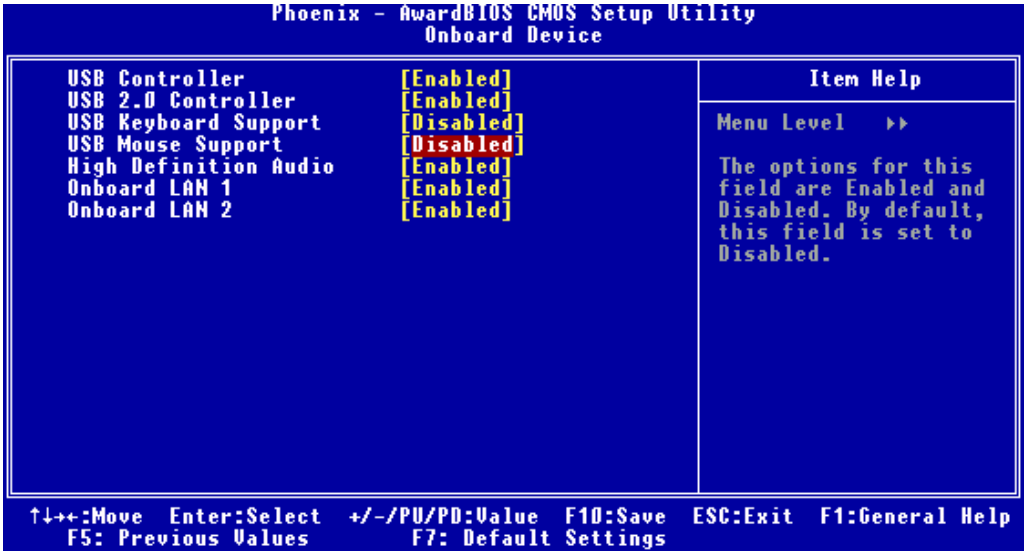

Phoenix - AwardBIOS CMOS Setup Utility
OnChip IDE Device
IDE HDD Block Mode [Enabled]
IDE DMA transfer access [Enabled]
IDE Primary Master PIO [Auto]
IDE Primary Slave PIO [Auto]
IDE Primary Master UDMA [Auto]
IDE Primary Slave UDMA [Auto]
IDE Secondary Master PIO [Auto]
IDE Secondary Slave PIO [Auto]
IDE Secondary Master UDMA [Auto]
IDE Secondary Slave UDMA [Auto]
*** On-Chip Serial ATA Setting ***
On-Chip Serial ATA [Enhanced Mode]
PATA IDE Mode [Primary]
SATA Port P2,P4 is Secondary
Item Help
Menu Level ▸▸
This item allows you to select the parallel ATA channel. Options are Primary and Secondary.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

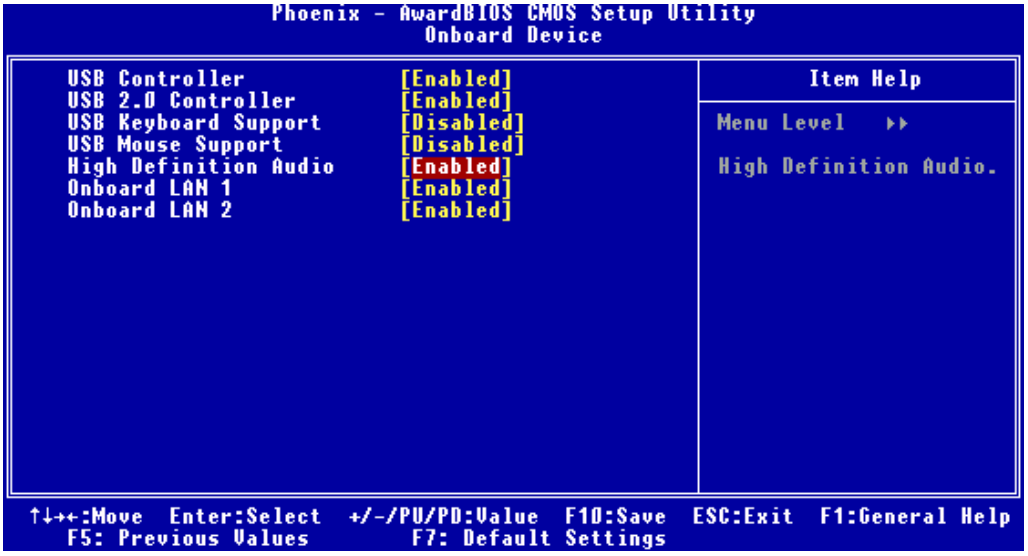

Phoenix - AwardBIOS CMOS Setup Utility
Integrated Peripherals
▸ OnChip IDE Device [Press Enter]
▸ Onboard Device [Press Enter]
▸ SuperIO Device [Press Enter]
Item Help
Menu Level ▸
This field allows you to configure the USB controller, audio and on-board LAN.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

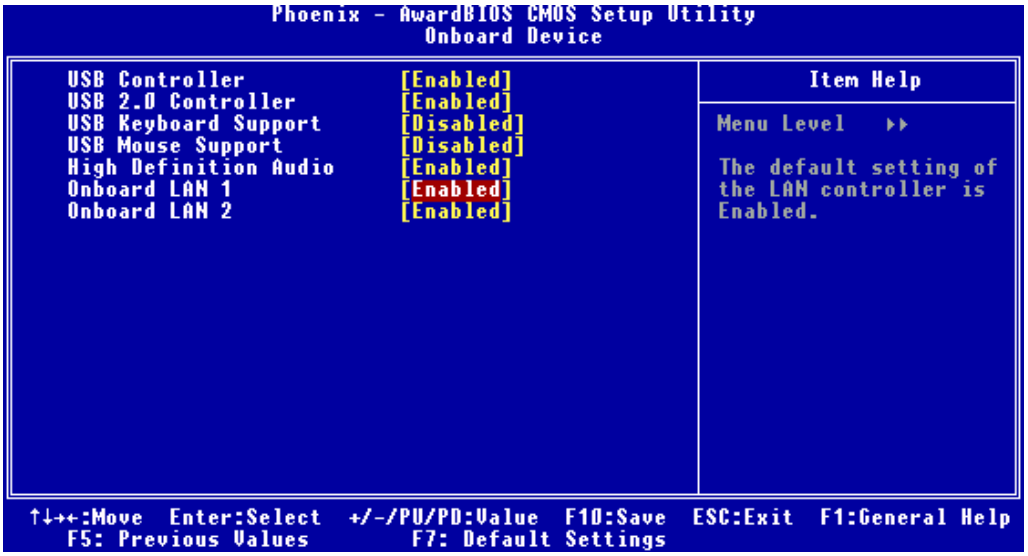

Phoenix - AwardBIOS CMOS Setup Utility
Onboard Device
USB Controller [Enabled]
USB 2.0 Controller [Enabled]
USB Keyboard Support [Disabled]
USB Mouse Support [Disabled]
High Definition Audio [Enabled]
Onboard LAN 1 [Enabled]
Onboard LAN 2 [Enabled]
Item Help
Menu Level ▸▸
The options for this field are Enabled and Disabled. By default, this field is set to Enabled.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

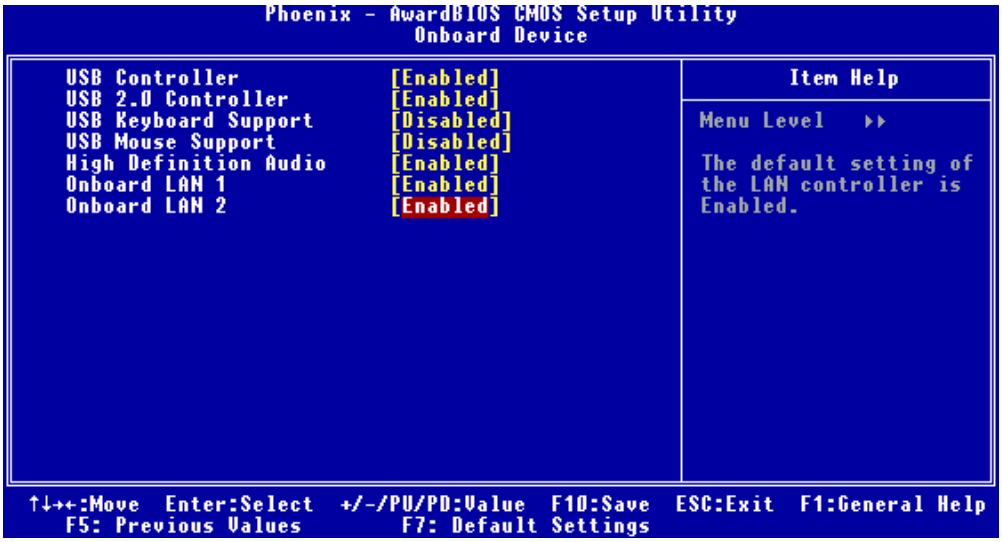

Phoenix - AwardBIOS CMOS Setup Utility
Onboard Device
USB Controller [Enabled]
USB 2.0 Controller [Enabled]
USB Keyboard Support [Disabled]
USB Mouse Support [Disabled]
High Definition Audio [Enabled]
Onboard LAN 1 [Enabled]
Onboard LAN 2 [Enabled]
Item Help
Menu Level ▸▸
Enable or disable EHCI controller for USB 2.0 support.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

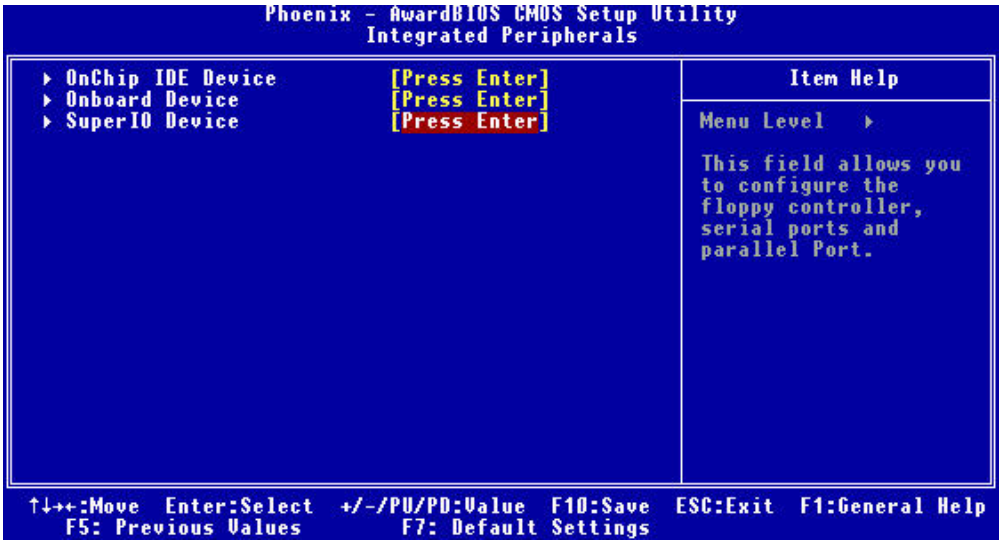

Phoenix - AwardBIOS CMOS Setup Utility
Onboard Device
USB Controller [Enabled]
USB 2.0 Controller [Enabled]
USB Keyboard Support [Disabled]
USB Mouse Support [Disabled]
High Definition Audio [Enabled]
Onboard LAN 1 [Enabled]
Onboard LAN 2 [Enabled]
Item Help
Menu Level ▸▸
The options for this field are Enabled and Disabled. By default, this field is set to Disabled.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

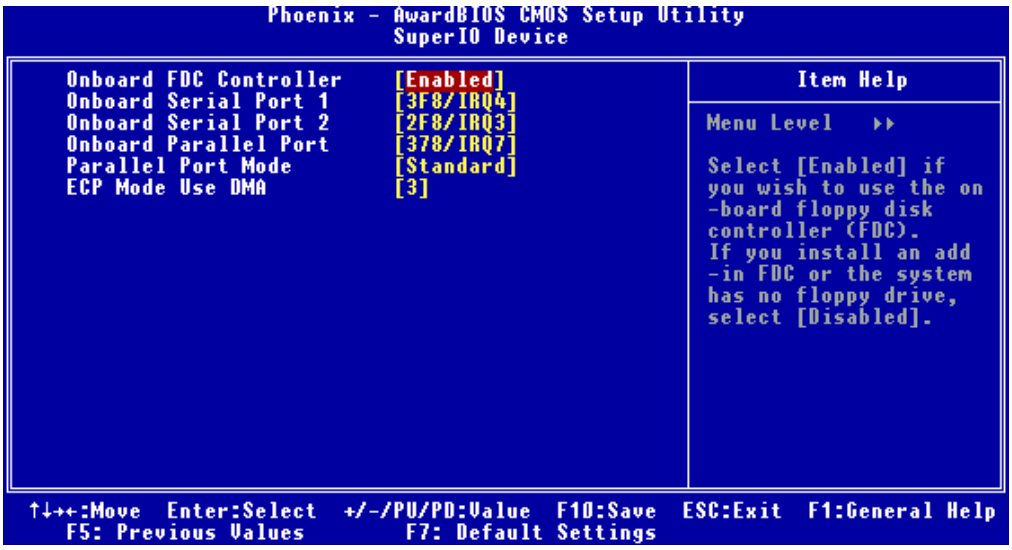

Phoenix - AwardBIOS CMOS Setup Utility
Onboard Device
USB Controller [Enabled]
USB 2.0 Controller [Enabled]
USB Keyboard Support [Disabled]
USB Mouse Support [Disabled]
High Definition Audio [Enabled]
Onboard LAN 1 [Enabled]
Onboard LAN 2 [Enabled]
Item Help
Menu Level ▸▸
The options for this field are Enabled and Disabled. By default, this field is set to Disabled.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

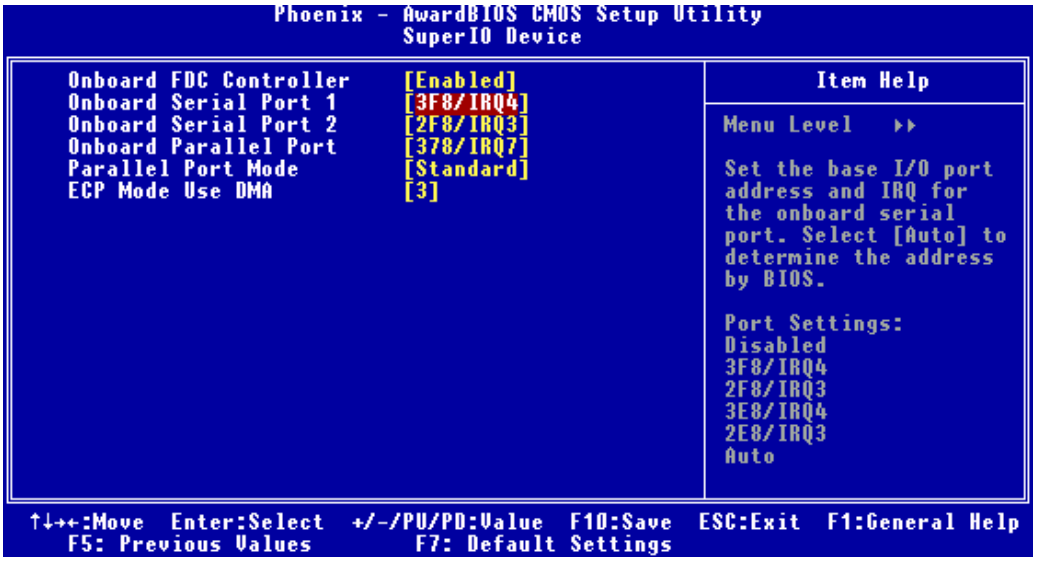

Phoenix - AwardBIOS CMOS Setup Utility
Onboard Device
USB Controller [Enabled]
USB 2.0 Controller [Enabled]
USB Keyboard Support [Disabled]
USB Mouse Support [Disabled]
High Definition Audio [Enabled]
Onboard LAN 1 [Enabled]
Onboard LAN 2 [Enabled]
Item Help
Menu Level ▸▸
High Definition Audio.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

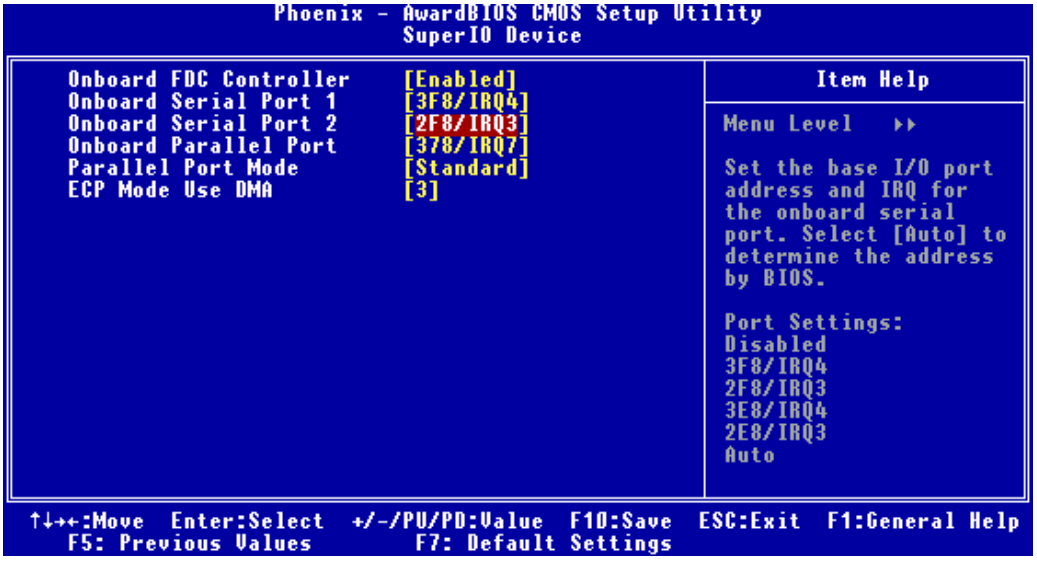

Phoenix - AwardBIOS CMOS Setup Utility
Onboard Device
USB Controller [Enabled]
USB 2.0 Controller [Enabled]
USB Keyboard Support [Disabled]
USB Mouse Support [Disabled]
High Definition Audio [Enabled]
Onboard LAN 1 [Enabled]
Onboard LAN 2 [Enabled]
Item Help
Menu Level ▸▸
The default setting of the LAN controller is Enabled.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

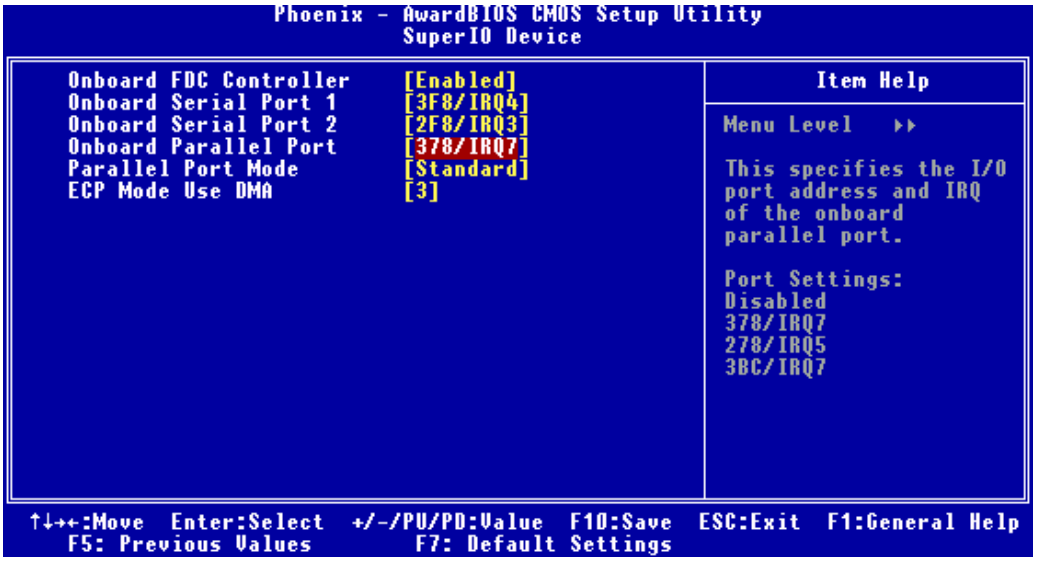

Phoenix - AwardBIOS CMOS Setup Utility
Onboard Device
USB Controller [Enabled]
USB 2.0 Controller [Enabled]
USB Keyboard Support [Disabled]
USB Mouse Support [Disabled]
High Definition Audio [Enabled]
Onboard LAN 1 [Enabled]
Onboard LAN 2 [Enabled]
Item Help
Menu Level ▸▸
The default setting of the LAN controller is Enabled.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

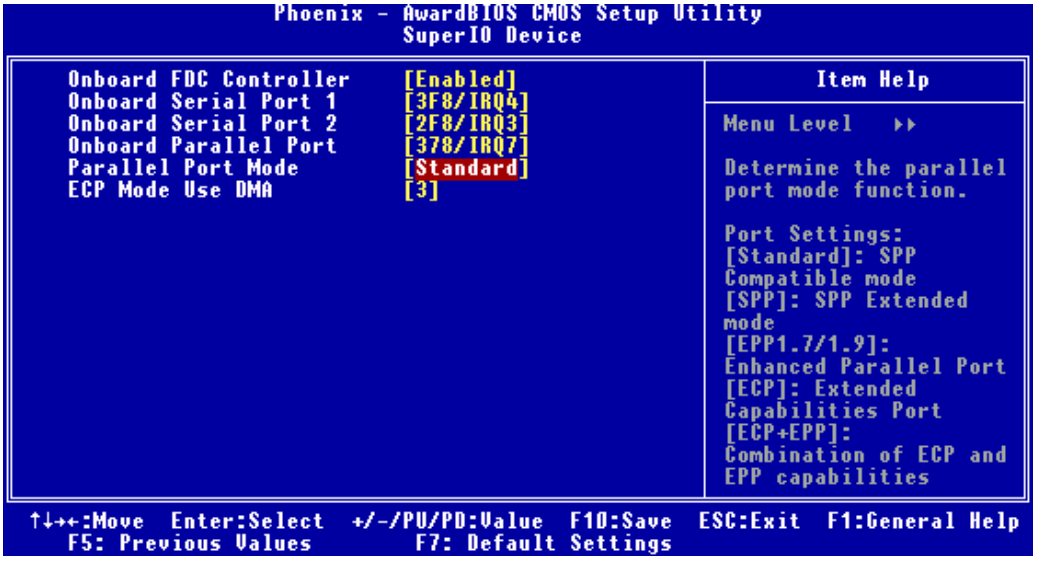

Phoenix - AwardBIOS CMOS Setup Utility
Integrated Peripherals
OnChip IDE Device [Press Enter]
Onboard Device [Press Enter]
SuperIO Device [Press Enter]
Item Help
Menu Level ▸
This field allows you to configure the floppy controller, serial ports and parallel Port.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

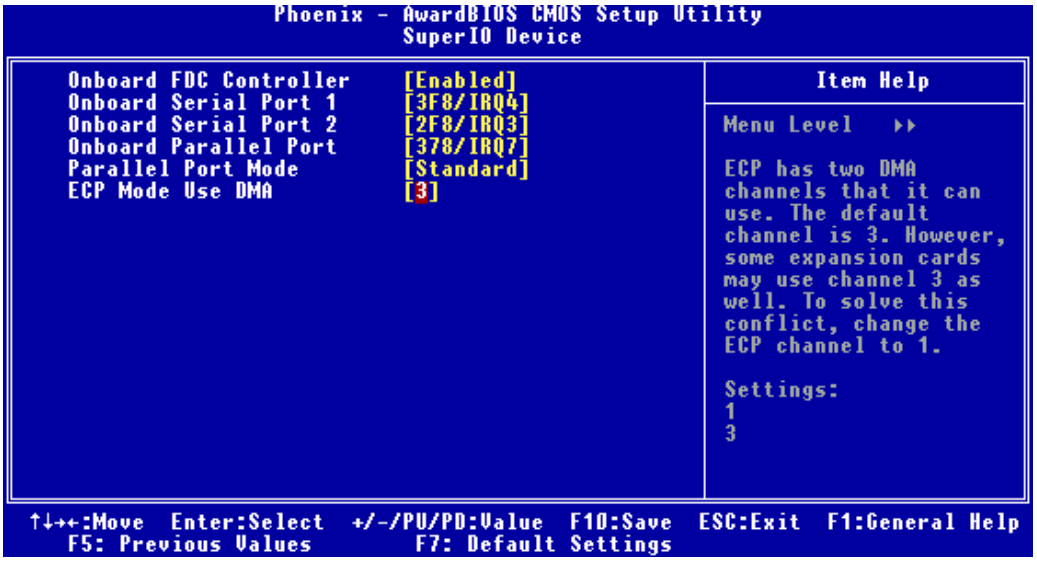

Phoenix - AwardBIOS CMOS Setup Utility
SuperIO Device
Onboard FDC Controller [Enabled]
Onboard Serial Port 1 [3F8/IRQ4]
Onboard Serial Port 2 [2F8/IRQ3]
Onboard Parallel Port [378/IRQ7]
Parallel Port Mode [Standard]
ECP Mode Use DMA [3]
Item Help
Menu Level ▸▸
Select [Enabled] if you wish to use the on-board floppy disk controller (FDC). If you install an add-in FDC or the system has no floppy drive, select [Disabled].
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings


Phoenix - AwardBIOS CMOS Setup Utility
SuperIO Device
Onboard FDC Controller [Enabled]
Onboard Serial Port 1 [3F8/IRQ4]
Onboard Serial Port 2 [2F8/IRQ3]
Onboard Parallel Port [378/IRQ7]
Parallel Port Mode [Standard]
ECP Mode Use DMA [3]
Item Help
Menu Level ▸▸
Set the base I/O port address and IRQ for the onboard serial port. Select [Auto] to determine the address by BIOS.
Port Settings:
Disabled
3F8/IRQ4
2F8/IRQ3
3E8/IRQ4
2E8/IRQ3
Auto
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

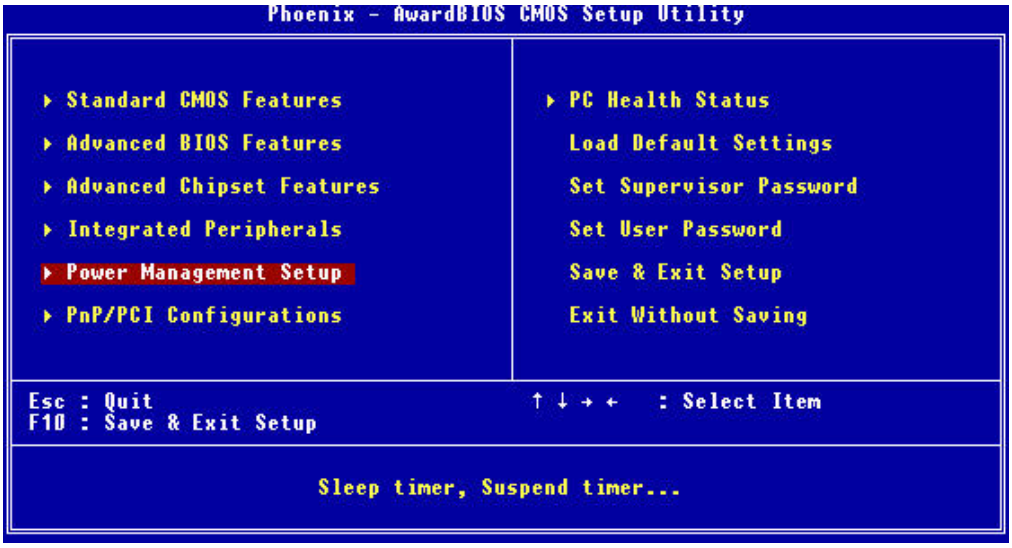

Phoenix - AwardBIOS CMOS Setup Utility
SuperIO Device
Onboard FDC Controller [Enabled]
Onboard Serial Port 1 [3F8/IRQ4]
Onboard Serial Port 2 [2F8/IRQ3]
Onboard Parallel Port [378/IRQ7]
Parallel Port Mode [Standard]
ECP Mode Use DMA [3]
Item Help
Menu Level ▸▸
Set the base I/O port address and IRQ for the onboard serial port. Select [Auto] to determine the address by BIOS.
Port Settings:
Disabled
3F8/IRQ4
2F8/IRQ3
3E8/IRQ4
2E8/IRQ3
Auto
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

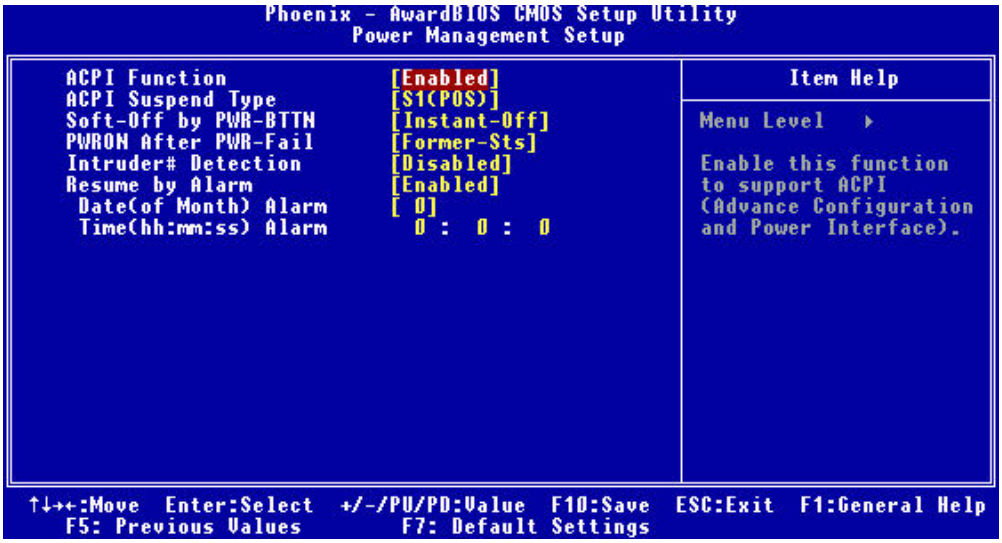

Phoenix - AwardBIOS CMOS Setup Utility
SuperIO Device
Onboard FDC Controller [Enabled]
Onboard Serial Port 1 [3F8/IRQ4]
Onboard Serial Port 2 [2F8/IRQ3]
Onboard Parallel Port [378/IRQ7]
Parallel Port Mode [Standard]
ECP Mode Use DMA [3]
Item Help
Menu Level ▸▸
This specifies the I/O port address and IRQ of the onboard parallel port.
Port Settings:
Disabled
378/IRQ7
278/IRQ5
3BC/IRQ7
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

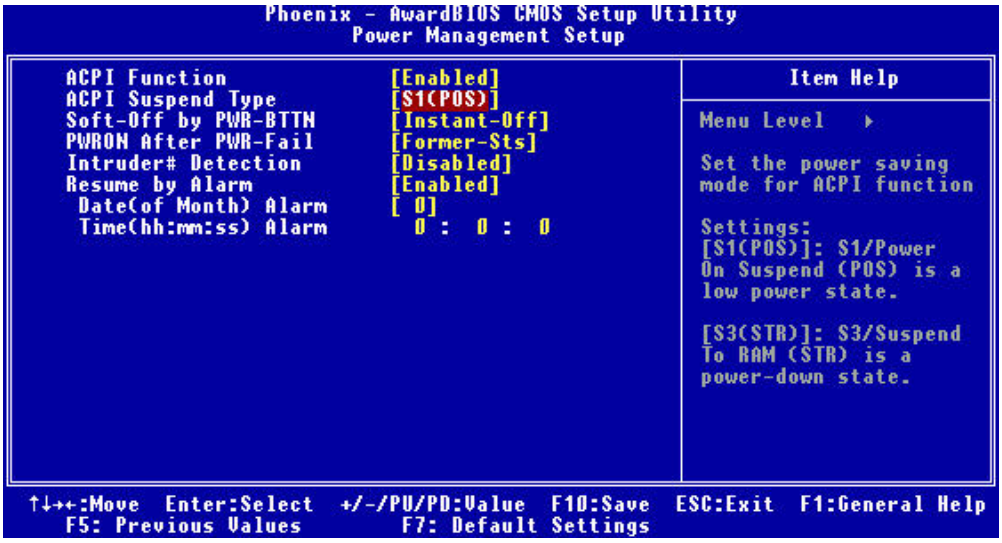

Phoenix - AwardBIOS CMOS Setup Utility
SuperIO Device
Onboard FDC Controller [Enabled]
Onboard Serial Port 1 [3F8/IRQ4]
Onboard Serial Port 2 [2F8/IRQ3]
Onboard Parallel Port [378/IRQ7]
Parallel Port Mode [Standard]
ECP Mode Use DMA [3]
Item Help
Menu Level ▸▸
Determine the parallel port mode function.
Port Settings:
[Standard]: SPP Compatible mode
[SPP]: SPP Extended mode
[EPP1.7/1.9]: Enhanced Parallel Port
[ECP]: Extended Capabilities Port
[ECP+EPP]: Combination of ECP and EPP capabilities
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

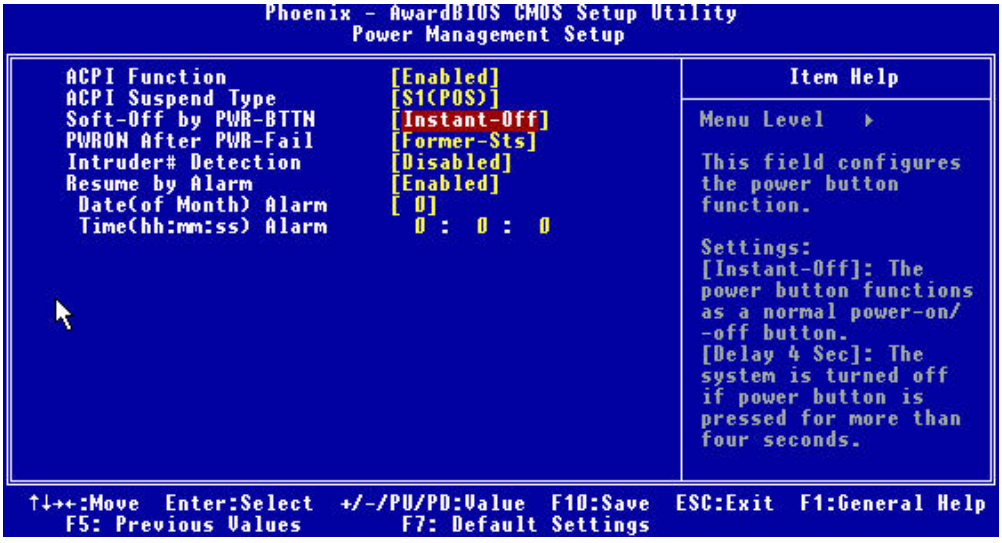

Phoenix - AwardBIOS CMOS Setup Utility
SuperIO Device
Onboard FDC Controller [Enabled]
Onboard Serial Port 1 [3F8/IRQ4]
Onboard Serial Port 2 [2F8/IRQ3]
Onboard Parallel Port [378/IRQ7]
Parallel Port Mode [Standard]
ECP Mode Use DMA [3]
Item Help
Menu Level ▸▸
ECP has two DMA channels that it can use. The default channel is 3. However, some expansion cards may use channel 3 as well. To solve this conflict, change the ECP channel to 1.
Settings:
1
3
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

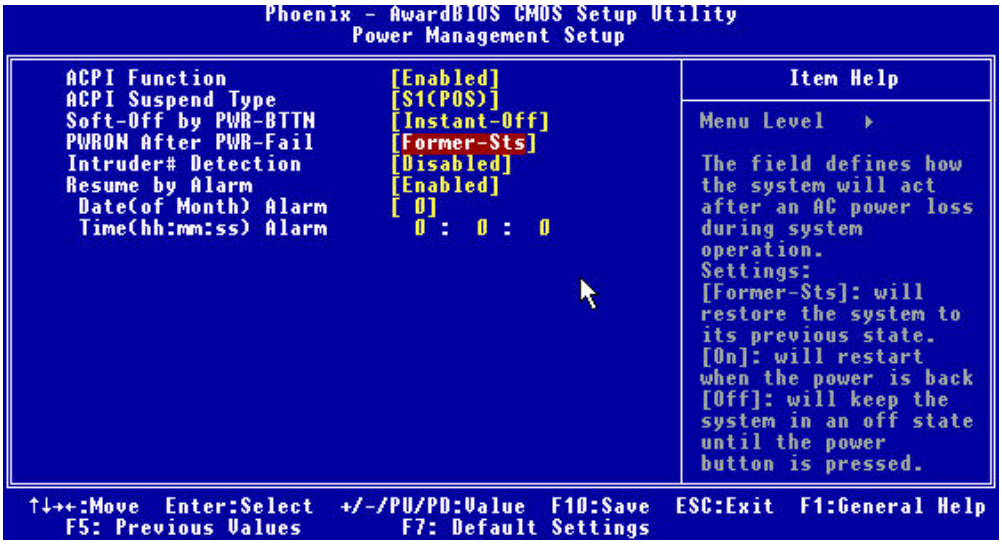
4.3.4.5 Power Management Setup

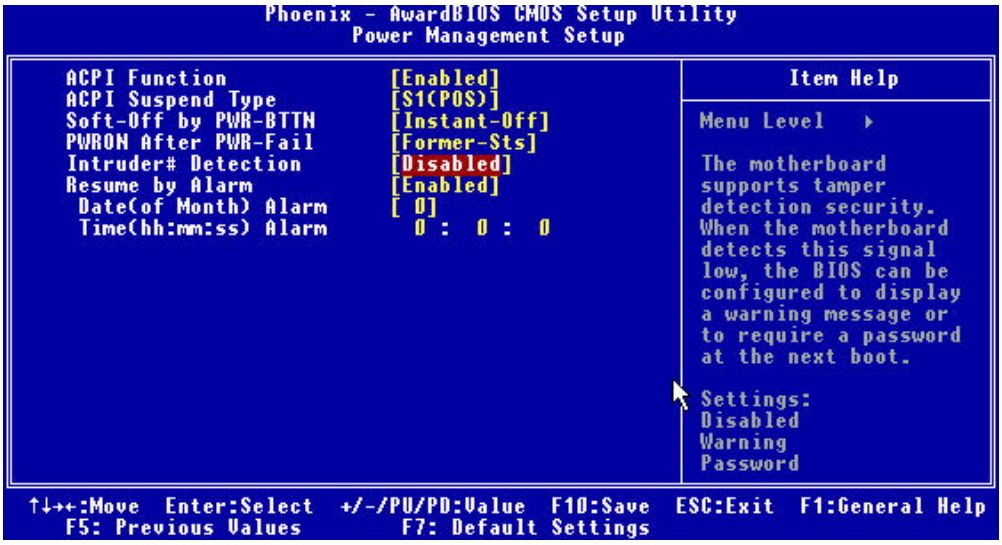


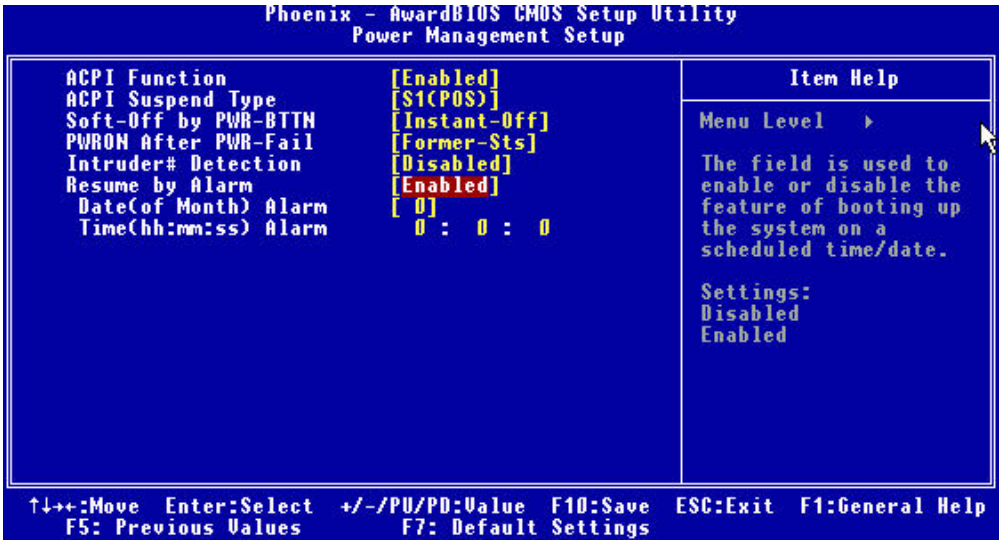

Phoenix - AwardBIOS CMOS Setup Utility
Power Management Setup
ACPI Function [Enabled]
ACPI Suspend Type [S1(POS)]
Soft-Off by PWR-BTTN [Instant-Off]
PWRON After PWR-Fail [Former-Sts]
Intruder# Detection [Disabled]
Resume by Alarm [Enabled]
Date(of Month) Alarm [0]
Time(hh:mm:ss) Alarm 0 : 0 : 0
Item Help
Menu Level ▸
Enable this function to support ACPI (Advance Configuration and Power Interface).
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

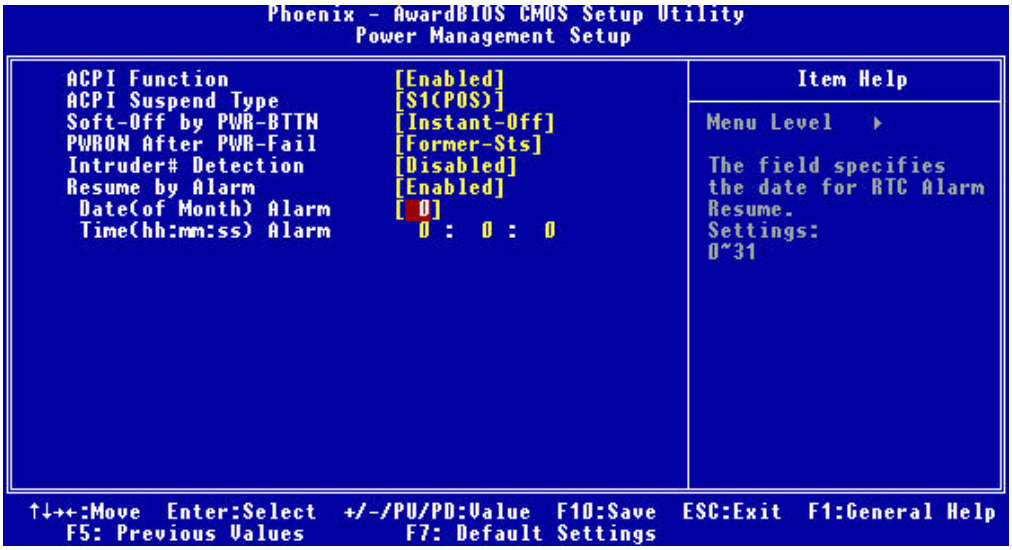

Phoenix - AwardBIOS CMOS Setup Utility
Power Management Setup
ACPI Function [Enabled]
ACPI Suspend Type [S1(POS)]
Soft-Off by PWR-BTTN [Instant-Off]
PWRON After PWR-Fail [Former-Sts]
Intruder# Detection [Disabled]
Resume by Alarm [Enabled]
Date(of Month) Alarm [0]
Time(hh:mm:ss) Alarm 0 : 0 : 0
Item Help
Menu Level ▸
Set the power saving mode for ACPI function
Settings:
[S1(POS)]: S1/Power On Suspend (POS) is a low power state.
[S3(STR)]: S3/Suspend To RAM (STR) is a power-down state.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

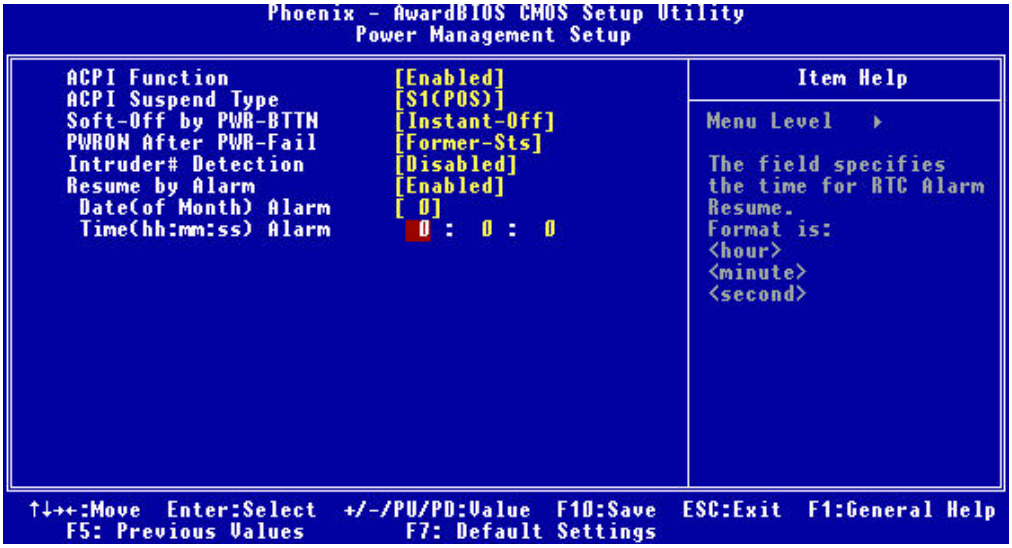

Phoenix - AwardBIOS CMOS Setup Utility
Power Management Setup
ACPI Function [Enabled]
ACPI Suspend Type [S1(POS)]
Soft-Off by PWR-BTTN [Instant-Off]
PWRON After PWR-Fail [Former-Sts]
Intruder# Detection [Disabled]
Resume by Alarm [Enabled]
Date(of Month) Alarm [0]
Time(hh:mm:ss) Alarm 0 : 0 : 0
Item Help
Menu Level ▸
This field configures the power button function.
Settings:
[Instant-Off]: The power button functions as a normal power-on/-off button.
[Delay 4 Sec]: The system is turned off if power button is pressed for more than four seconds.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings


Phoenix - AwardBIOS CMOS Setup Utility
Power Management Setup
ACPI Function [Enabled]
ACPI Suspend Type [S1(POS)]
Soft-Off by PWR-BTTN [Instant-Off]
PWRON After PWR-Fail [Former-Sts]
Intruder# Detection [Disabled]
Resume by Alarm [Enabled]
Date(of Month) Alarm [0]
Time(hh:mm:ss) Alarm 0 : 0 : 0
Item Help
Menu Level ▸
The field defines how the system will act after an AC power loss during system operation.
Settings:
[Former-Sts]: will restore the system to its previous state.
[On]: will restart when the power is back
[Off]: will keep the system in an off state until the power button is pressed.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

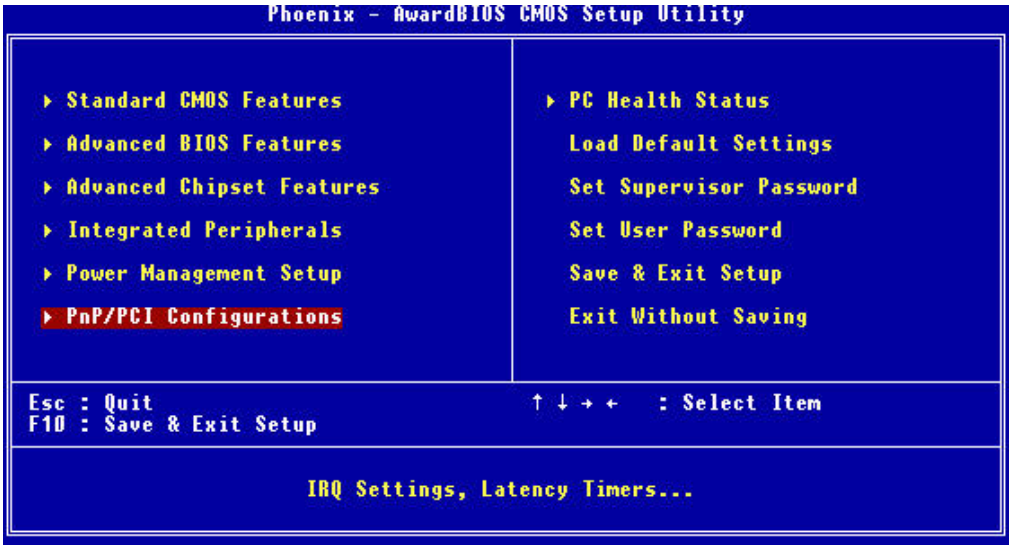

Phoenix - AwardBIOS CMOS Setup Utility
Power Management Setup
ACPI Function [Enabled]
ACPI Suspend Type [S1(POS)]
Soft-Off by PWR-BTTN [Instant-Off]
PWRON After PWR-Fail [Former-Sts]
Intruder# Detection [Disabled]
Resume by Alarm [Enabled]
Date(of Month) Alarm [0]
Time(hh:mm:ss) Alarm 0 : 0 : 0
Item Help
Menu Level ▸
The motherboard supports tamper detection security. When the motherboard detects this signal low, the BIOS can be configured to display a warning message or to require a password at the next boot.
Settings:
Disabled
Warning
Password
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

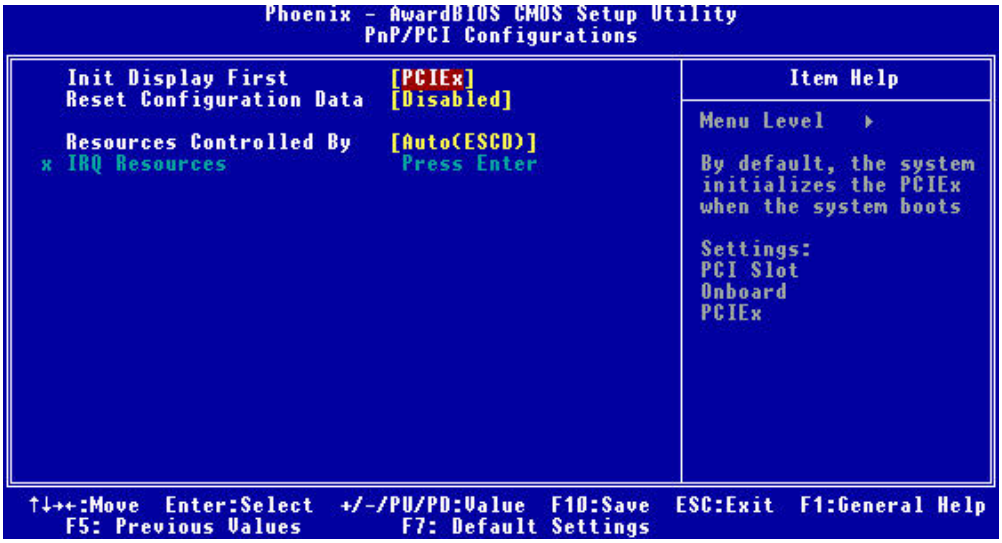

Phoenix - AwardBIOS CMOS Setup Utility
Power Management Setup
ACPI Function [Enabled]
ACPI Suspend Type [S1(POS)]
Soft-Off by PWR-BTTN [Instant-Off]
PWRON After PWR-Fail [Former-Sts]
Intruder# Detection [Disabled]
Resume by Alarm [Enabled]
Date(of Month) Alarm [0]
Time(hh:mm:ss) Alarm 0 : 0 : 0
Item Help
Menu Level ▸
The field is used to enable or disable the feature of booting up the system on a scheduled time/date.
Settings:
Disabled
Enabled
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

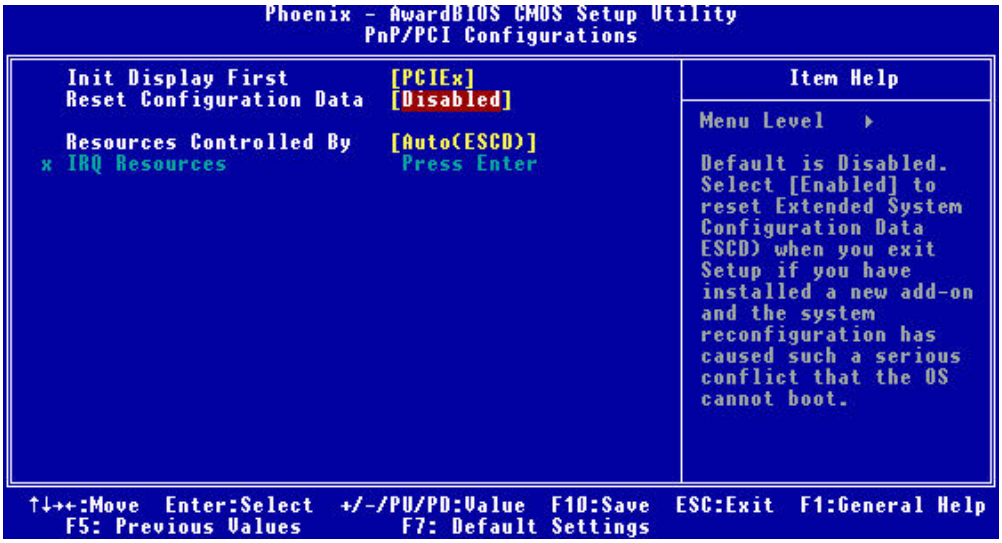

Phoenix - AwardBIOS CMOS Setup Utility
Power Management Setup
ACPI Function [Enabled]
ACPI Suspend Type [S1(POS)]
Soft-Off by PWR-BTTN [Instant-Off]
PWRON After PWR-Fail [Former-Sts]
Intruder# Detection [Disabled]
Resume by Alarm [Enabled]
Date(of Month) Alarm [0]
Time(hh:mm:ss) Alarm 0 : 0 : 0
Item Help
Menu Level ▸
The field specifies the date for RTC Alarm Resume.
Settings:
0~31
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

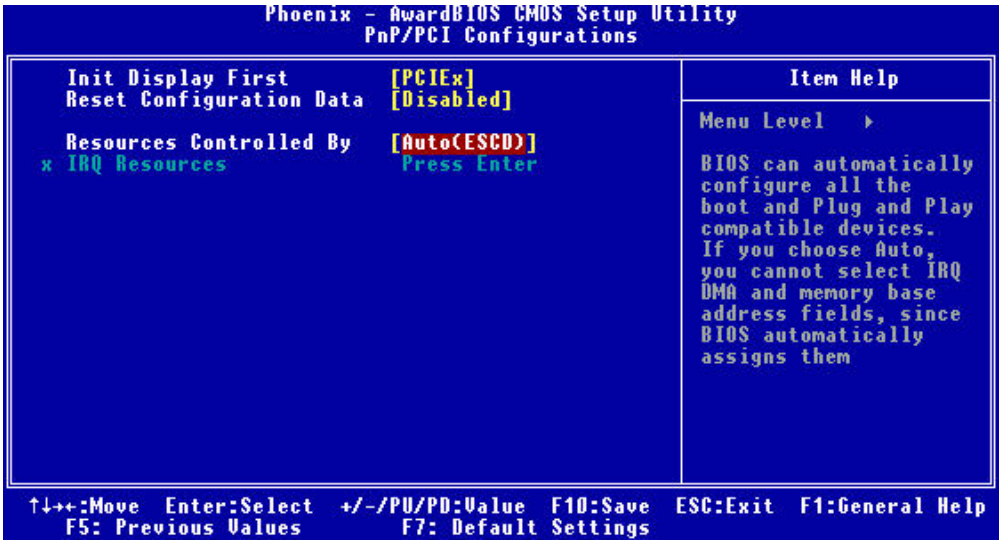

Phoenix - AwardBIOS CMOS Setup Utility
Power Management Setup
ACPI Function [Enabled]
ACPI Suspend Type [S1(POS)]
Soft-Off by PWR-BTTN [Instant-Off]
PWRON After PWR-Fail [Former-Sts]
Intruder# Detection [Disabled]
Resume by Alarm [Enabled]
Date(of Month) Alarm [0]
Time(hh:mm:ss) Alarm 0 : 0 : 0
Item Help
Menu Level ▸
The field specifies the time for RTC Alarm Resume.
Format is:
<hour>
<minute>
<second>
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

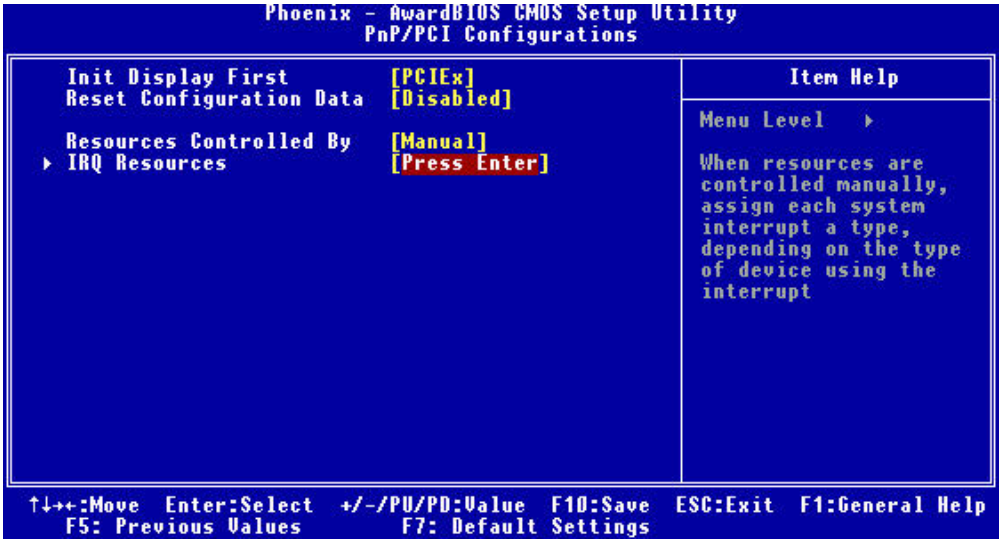
4.3.4.6 PnP/PCI Configurations

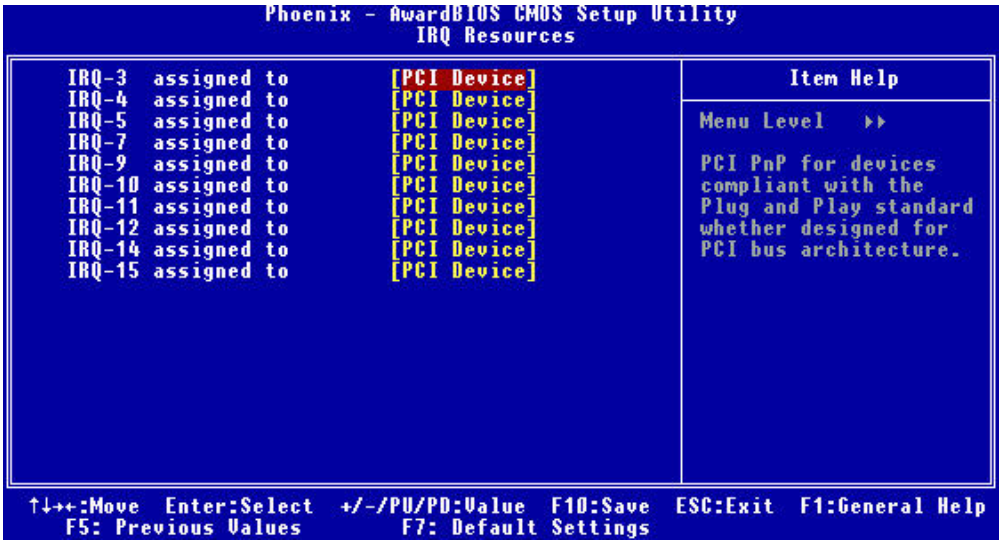

Phoenix - AwardBIOS CMOS Setup Utility
Standard CMOS Features
Advanced BIOS Features
Advanced Chipset Features
Integrated Peripherals
Power Management Setup
PnP/PCI Configurations
PC Health Status
Load Default Settings
Set Supervisor Password
Set User Password
Save & Exit Setup
Exit Without Saving
Esc : Quit
F10 : Save & Exit Setup
↑ ↓ → ← : Select Item
IRQ Settings, Latency Timers...


Phoenix - AwardBIOS CMOS Setup Utility
PnP/PCI Configurations
Init Display First [PCIEx]
Reset Configuration Data [Disabled]
Resources Controlled By [Auto(ESCD)]
x IRQ Resources Press Enter
Item Help
Menu Level ▸
By default, the system initializes the PCIEx when the system boots
Settings:
PCI Slot
Onboard
PCIEx
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

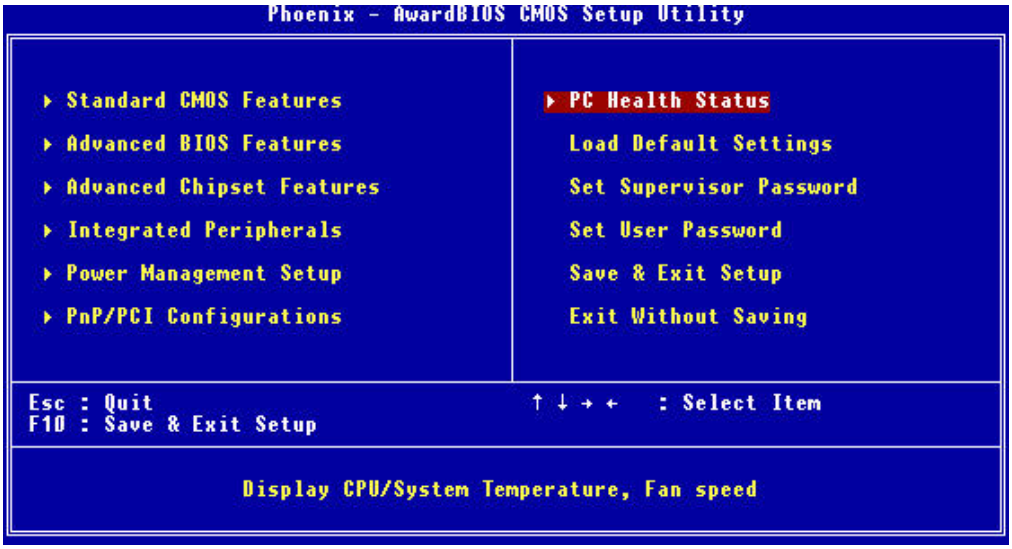

Phoenix - AwardBIOS CMOS Setup Utility
PnP/PCI Configurations
Init Display First [PCIEx]
Reset Configuration Data [Disabled]
Resources Controlled By [Auto(ESCD)]
x IRQ Resources Press Enter
Item Help
Menu Level ▸
Default is Disabled. Select [Enabled] to reset Extended System Configuration Data ESCD) when you exit Setup if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the OS cannot boot.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

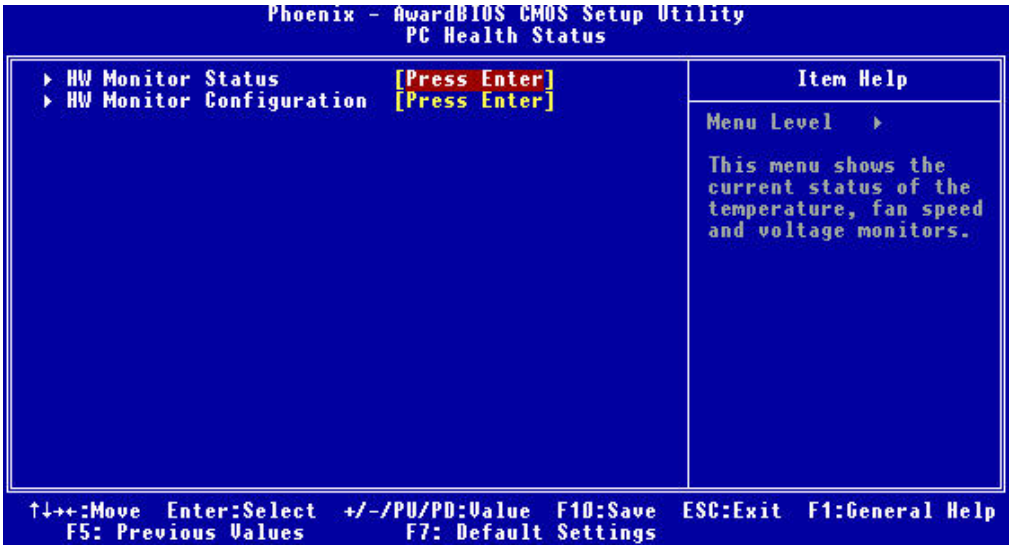

Phoenix - AwardBIOS CMOS Setup Utility
PnP/PCI Configurations
Init Display First [PCIEx]
Reset Configuration Data [Disabled]
Resources Controlled By [Auto(ESCD)]
x IRQ Resources Press Enter
Item Help
Menu Level ▸
BIOS can automatically configure all the boot and Plug and Play compatible devices. If you choose Auto, you cannot select IRQ DMA and memory base address fields, since BIOS automatically assigns them
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

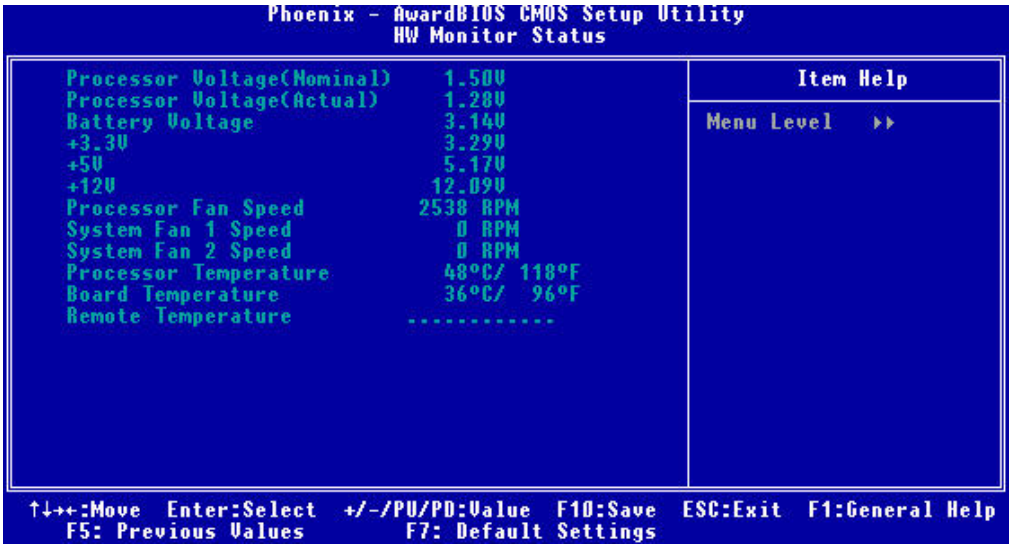

Phoenix - AwardBIOS CMOS Setup Utility
PnP/PCI Configurations
Init Display First [PCIEx]
Reset Configuration Data [Disabled]
Resources Controlled By [Manual]
▸ IRQ Resources [Press Enter]
Item Help
Menu Level ▸
When resources are controlled manually, assign each system interrupt a type, depending on the type of device using the interrupt
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

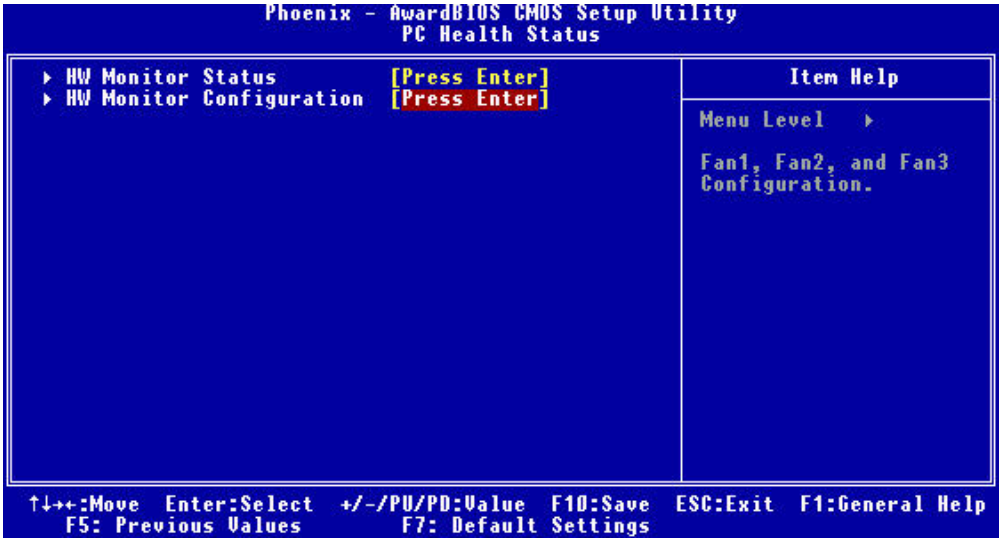

Phoenix - AwardBIOS CMOS Setup Utility
IRQ Resources
IRQ-3 assigned to [PCI Device]
IRQ-4 assigned to [PCI Device]
IRQ-5 assigned to [PCI Device]
IRQ-7 assigned to [PCI Device]
IRQ-9 assigned to [PCI Device]
IRQ-10 assigned to [PCI Device]
IRQ-11 assigned to [PCI Device]
IRQ-12 assigned to [PCI Device]
IRQ-14 assigned to [PCI Device]
IRQ-15 assigned to [PCI Device]
Item Help
Menu Level ▸▸
PCI PnP for devices compliant with the Plug and Play standard whether designed for PCI bus architecture.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

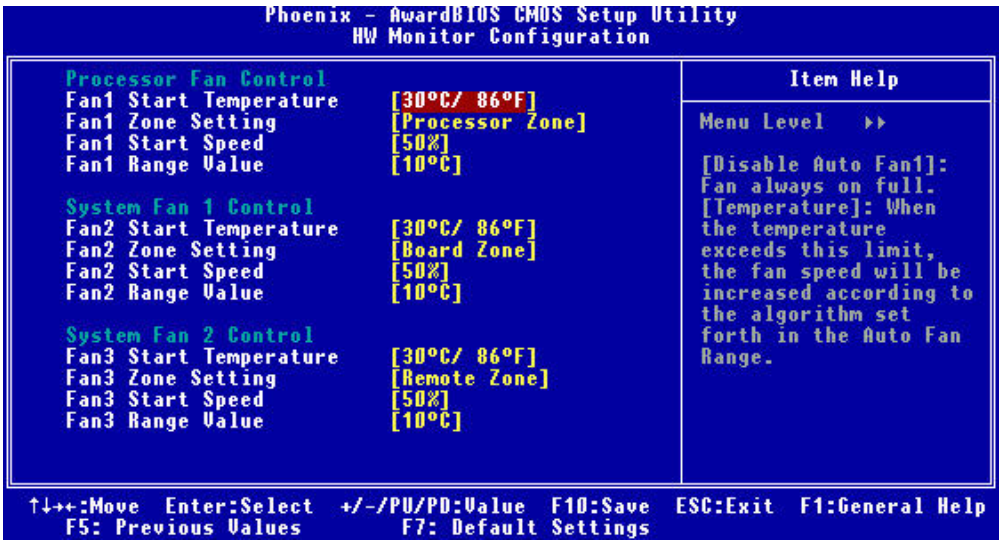
4.3.4.7 PC Health Status

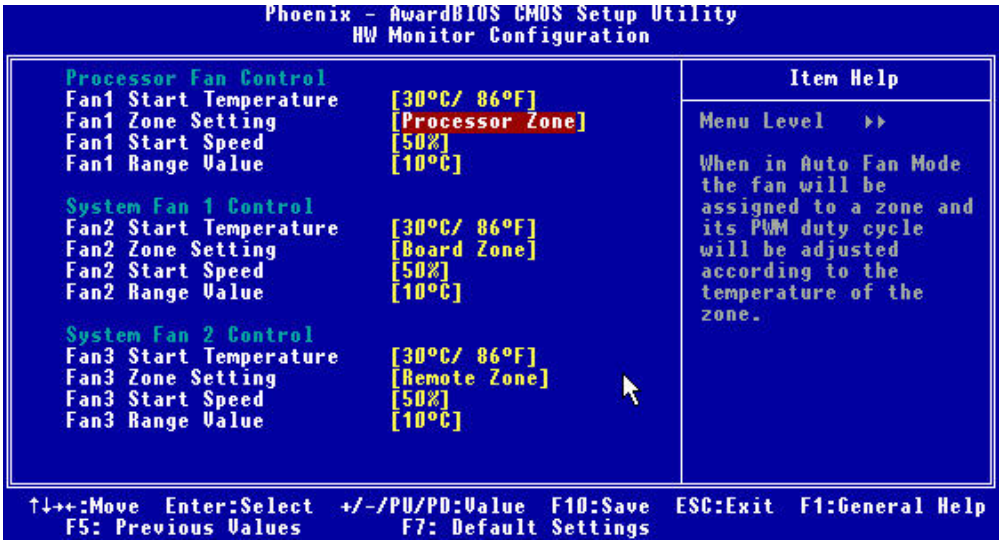


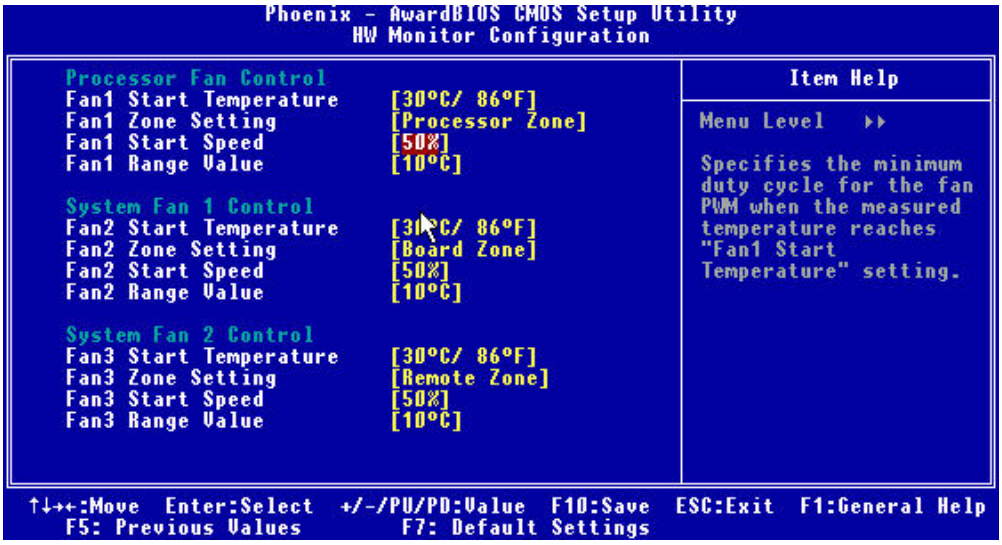

Phoenix - AwardBIOS CMOS Setup Utility
PC Health Status
HW Monitor Status [Press Enter]
HW Monitor Configuration [Press Enter]
Item Help
Menu Level ▸
This menu shows the current status of the temperature, fan speed and voltage monitors.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

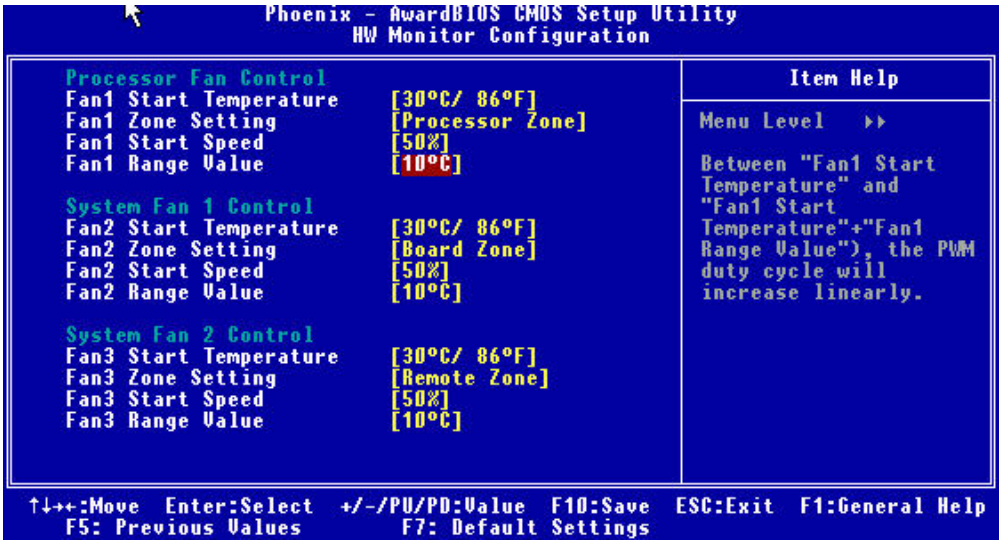

Phoenix - AwardBIOS CMOS Setup Utility
HW Monitor Status
Processor Voltage(Nominal) 1.50V
Processor Voltage(Actual) 1.28V
Battery Voltage 3.14V
+3.3V 3.29V
+5V 5.17V
+12V 12.09V
Processor Fan Speed 2538 RPM
System Fan 1 Speed 0 RPM
System Fan 2 Speed 0 RPM
Processor Temperature 48°C/ 118°F
Board Temperature 36°C/ 96°F
Remote Temperature .....
Item Help
Menu Level ▸▸
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings


Phoenix - AwardBIOS CMOS Setup Utility
PC Health Status
▸ HW Monitor Status [Press Enter]
▸ HW Monitor Configuration [Press Enter]
Item Help
Menu Level ▸
Fan1, Fan2, and Fan3 Configuration.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings


Phoenix - AwardBIOS CMOS Setup Utility
HW Monitor Configuration
Processor Fan Control
Fan1 Start Temperature [30°C/ 86°F]
Fan1 Zone Setting [Processor Zone]
Fan1 Start Speed [50%]
Fan1 Range Value [10°C]
System Fan 1 Control
Fan2 Start Temperature [30°C/ 86°F]
Fan2 Zone Setting [Board Zone]
Fan2 Start Speed [50%]
Fan2 Range Value [10°C]
System Fan 2 Control
Fan3 Start Temperature [30°C/ 86°F]
Fan3 Zone Setting [Remote Zone]
Fan3 Start Speed [50%]
Fan3 Range Value [10°C]
Item Help
Menu Level ▸▸
[Disable Auto Fan1]: Fan always on full. [Temperature]: When the temperature exceeds this limit, the fan speed will be increased according to the algorithm set forth in the Auto Fan Range.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings


Phoenix - AwardBIOS CMOS Setup Utility
HW Monitor Configuration
Processor Fan Control
Fan1 Start Temperature [30°C/ 86°F]
Fan1 Zone Setting [Processor Zone]
Fan1 Start Speed [50%]
Fan1 Range Value [10°C]
System Fan 1 Control
Fan2 Start Temperature [30°C/ 86°F]
Fan2 Zone Setting [Board Zone]
Fan2 Start Speed [50%]
Fan2 Range Value [10°C]
System Fan 2 Control
Fan3 Start Temperature [30°C/ 86°F]
Fan3 Zone Setting [Remote Zone]
Fan3 Start Speed [50%]
Fan3 Range Value [10°C]
Item Help
Menu Level ▸▸
When in Auto Fan Mode the fan will be assigned to a zone and its PWM duty cycle will be adjusted according to the temperature of the zone.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings


Phoenix - AwardBIOS CMOS Setup Utility
HW Monitor Configuration
Processor Fan Control
Fan1 Start Temperature [30°C/ 86°F]
Fan1 Zone Setting [Processor Zone]
Fan1 Start Speed [50%]
Fan1 Range Value [10°C]
System Fan 1 Control
Fan2 Start Temperature [30°C/ 86°F]
Fan2 Zone Setting [Board Zone]
Fan2 Start Speed [50%]
Fan2 Range Value [10°C]
System Fan 2 Control
Fan3 Start Temperature [30°C/ 86°F]
Fan3 Zone Setting [Remote Zone]
Fan3 Start Speed [50%]
Fan3 Range Value [10°C]
Item Help
Menu Level ▸▸
Specifies the minimum duty cycle for the fan PWM when the measured temperature reaches "Fan1 Start Temperature" setting.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings


Phoenix - AwardBIOS CMOS Setup Utility
HW Monitor Configuration
Processor Fan Control
Fan1 Start Temperature [30°C/ 86°F]
Fan1 Zone Setting [Processor Zone]
Fan1 Start Speed [50%]
Fan1 Range Value [10°C]
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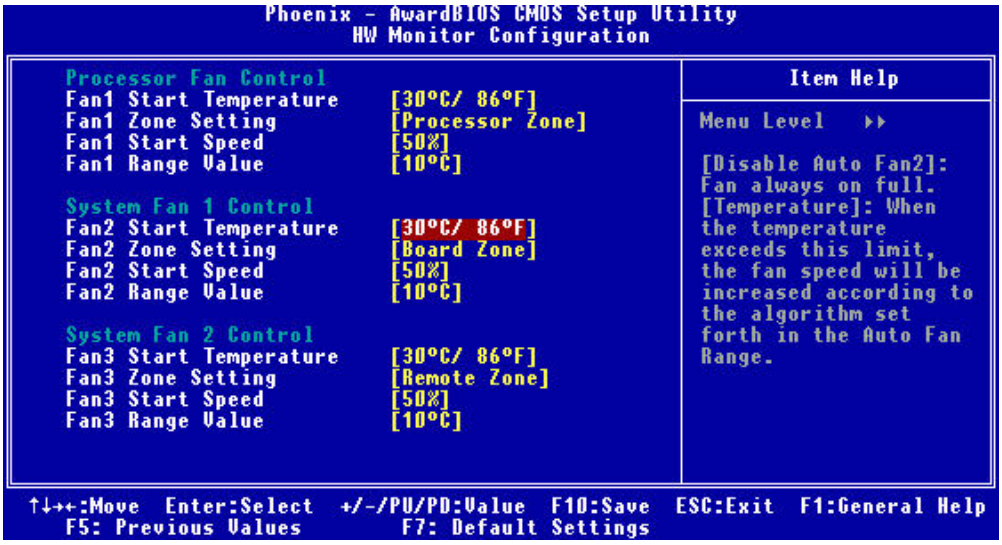
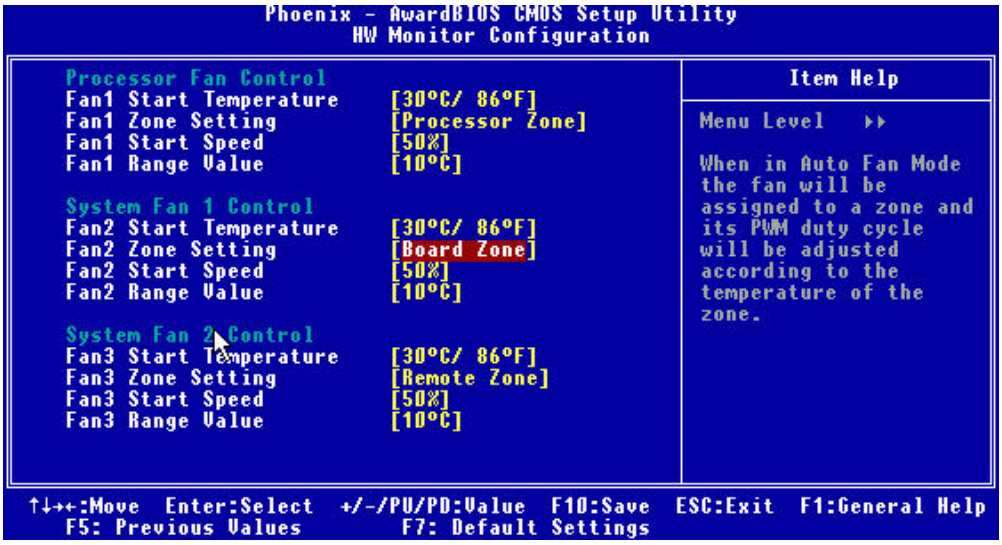
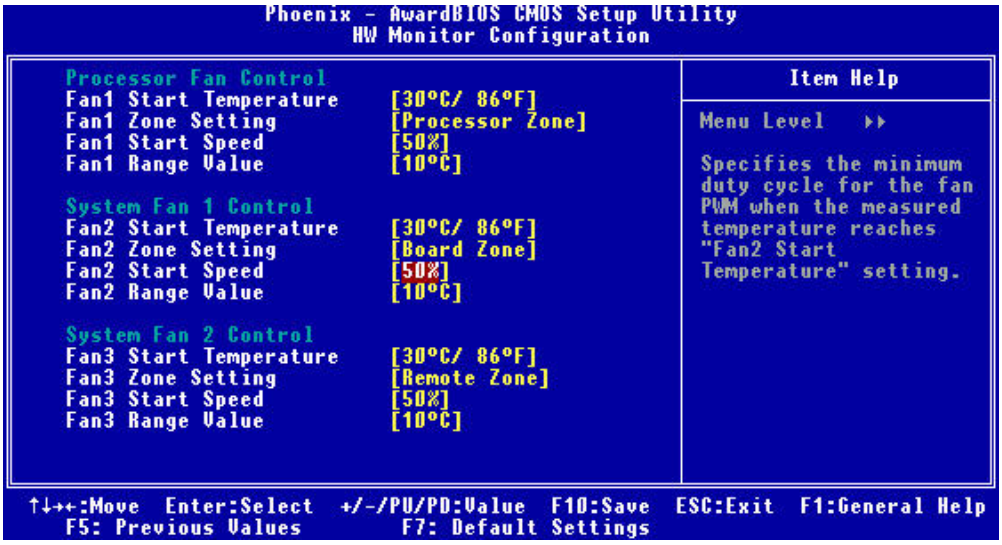
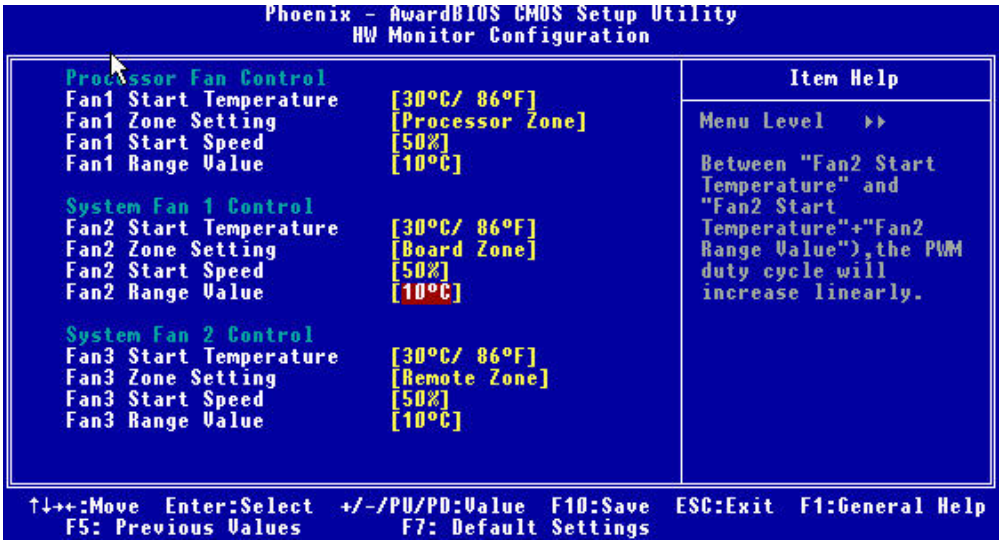
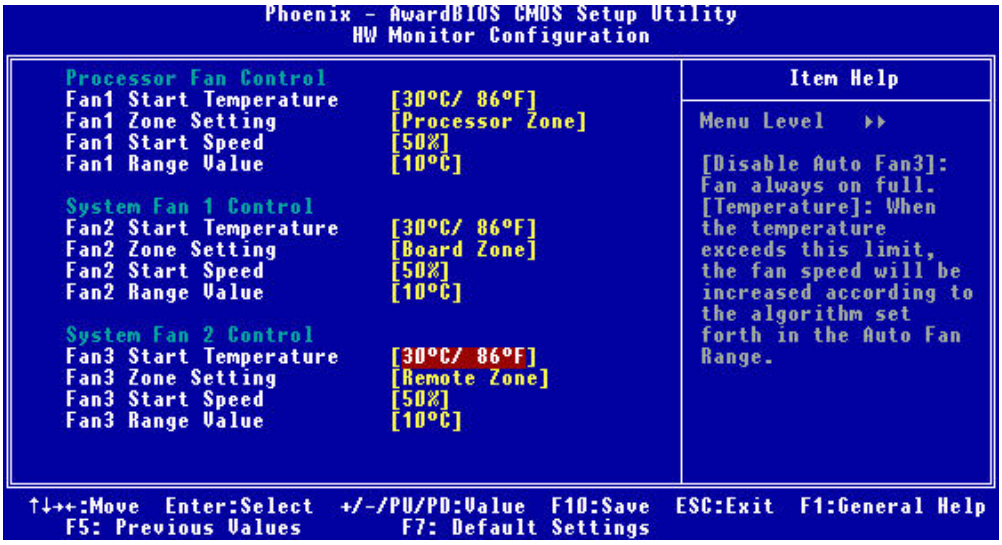
Fan2 Zone Setting [Board Zone]
Fan2 Start Speed [50%]
Fan2 Range Value [10°C]
System Fan 2 Control
Fan3 Start Temperature [30°C/ 86°F]
Fan3 Zone Setting [Remote Zone]
Fan3 Start Speed [50%]
Fan3 Range Value [10°C]
Item Help
Menu Level ▸▸
Between "Fan1 Start Temperature" and "Fan1 Start Temperature"+"Fan1 Range Value"), the PWM duty cycle will increase linearly.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

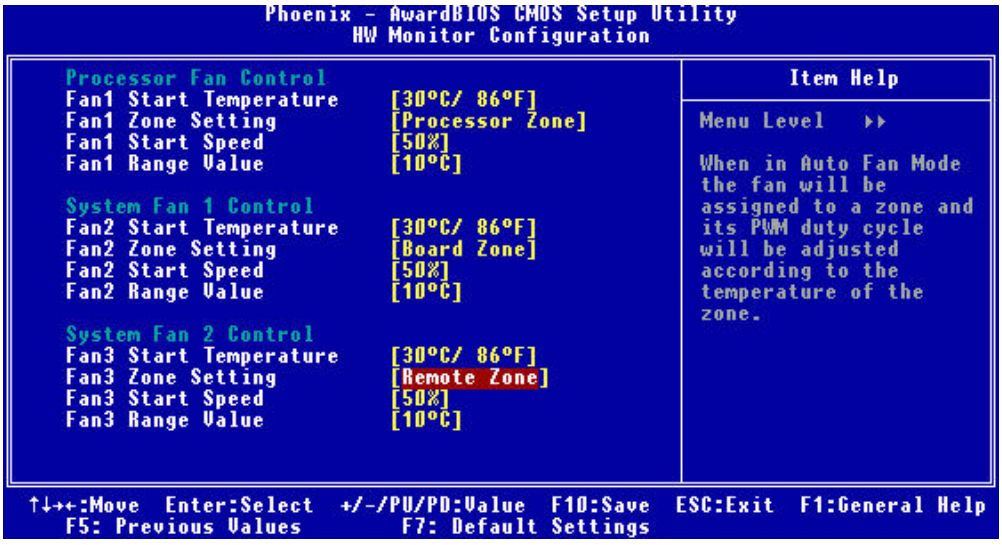

Phoenix - AwardBIOS CMOS Setup Utility
HW Monitor Configuration
Processor Fan Control
Fan1 Start Temperature [30°C/ 86°F]
Fan1 Zone Setting [Processor Zone]
Fan1 Start Speed [50%]
Fan1 Range Value [10°C]
System Fan 1 Control
Fan2 Start Temperature [30°C/ 86°F]
Fan2 Zone Setting [Board Zone]
Fan2 Start Speed [50%]
Fan2 Range Value [10°C]
System Fan 2 Control
Fan3 Start Temperature [30°C/ 86°F]
Fan3 Zone Setting [Remote Zone]
Fan3 Start Speed [50%]
Fan3 Range Value [10°C]
Item Help
Menu Level ▸▸
[Disable Auto Fan2]: Fan always on full. [Temperature]: When the temperature exceeds this limit, the fan speed will be increased according to the algorithm set forth in the Auto Fan Range.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

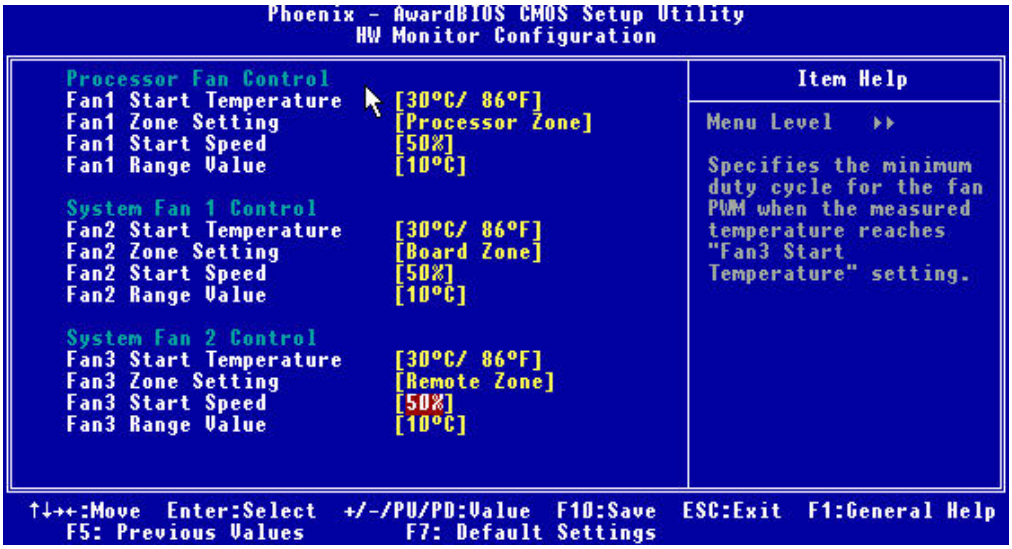

Phoenix - AwardBIOS CMOS Setup Utility
HW Monitor Configuration
Processor Fan Control
Fan1 Start Temperature [30°C/ 86°F]
Fan1 Zone Setting [Processor Zone]
Fan1 Start Speed [50%]
Fan1 Range Value [10°C]
System Fan 1 Control
Fan2 Start Temperature [30°C/ 86°F]
Fan2 Zone Setting [Board Zone]
Fan2 Start Speed [50%]
Fan2 Range Value [10°C]
System Fan 2 Control
Fan3 Start Temperature [30°C/ 86°F]
Fan3 Zone Setting [Remote Zone]
Fan3 Start Speed [50%]
Fan3 Range Value [10°C]
Item Help
Menu Level ▸▸
When in Auto Fan Mode the fan will be assigned to a zone and its PWM duty cycle will be adjusted according to the temperature of the zone.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

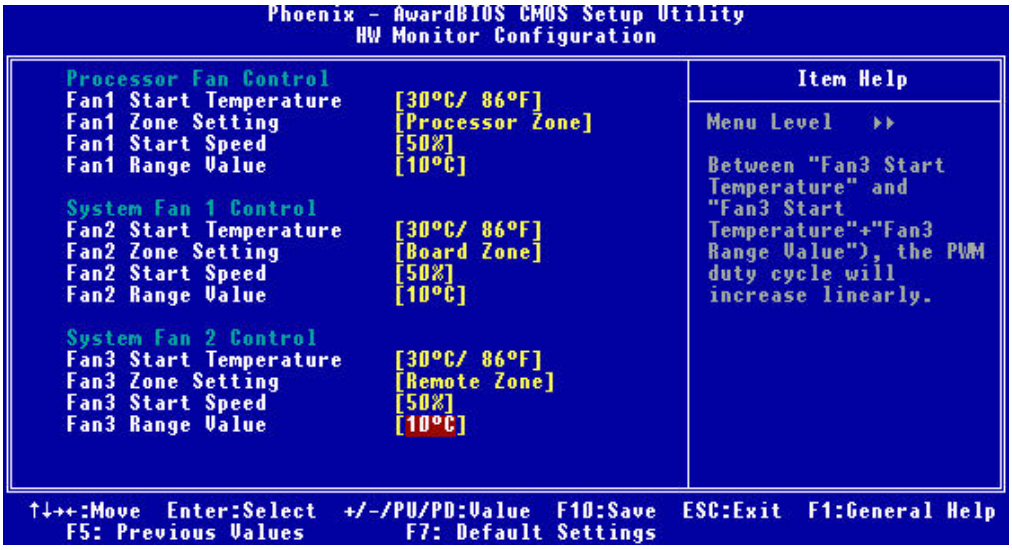

Phoenix - AwardBIOS CMOS Setup Utility
HW Monitor Configuration
Processor Fan Control
Fan1 Start Temperature [30°C/ 86°F]
Fan1 Zone Setting [Processor Zone]
Fan1 Start Speed [50%]
Fan1 Range Value [10°C]
System Fan 1 Control
Fan2 Start Temperature [30°C/ 86°F]
Fan2 Zone Setting [Board Zone]
Fan2 Start Speed [50%]
Fan2 Range Value [10°C]
System Fan 2 Control
Fan3 Start Temperature [30°C/ 86°F]
Fan3 Zone Setting [Remote Zone]
Fan3 Start Speed [50%]
Fan3 Range Value [10°C]
Item Help
Menu Level ▸▸
Specifies the minimum duty cycle for the fan PWM when the measured temperature reaches "Fan2 Start Temperature" setting.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings


Phoenix - AwardBIOS CMOS Setup Utility
HW Monitor Configuration
Processor Fan Control
Fan1 Start Temperature [30°C/ 86°F]
Fan1 Zone Setting [Processor Zone]
Fan1 Start Speed [50%]
Fan1 Range Value [10°C]
System Fan 1 Control
Fan2 Start Temperature [30°C/ 86°F]
Fan2 Zone Setting [Board Zone]
Fan2 Start Speed [50%]
Fan2 Range Value [10°C]
System Fan 2 Control
Fan3 Start Temperature [30°C/ 86°F]
Fan3 Zone Setting [Remote Zone]
Fan3 Start Speed [50%]
Fan3 Range Value [10°C]
Item Help
Menu Level ▸▸
Between "Fan2 Start Temperature" and "Fan2 Start Temperature"+"Fan2 Range Value"),the PWM duty cycle will increase linearly.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

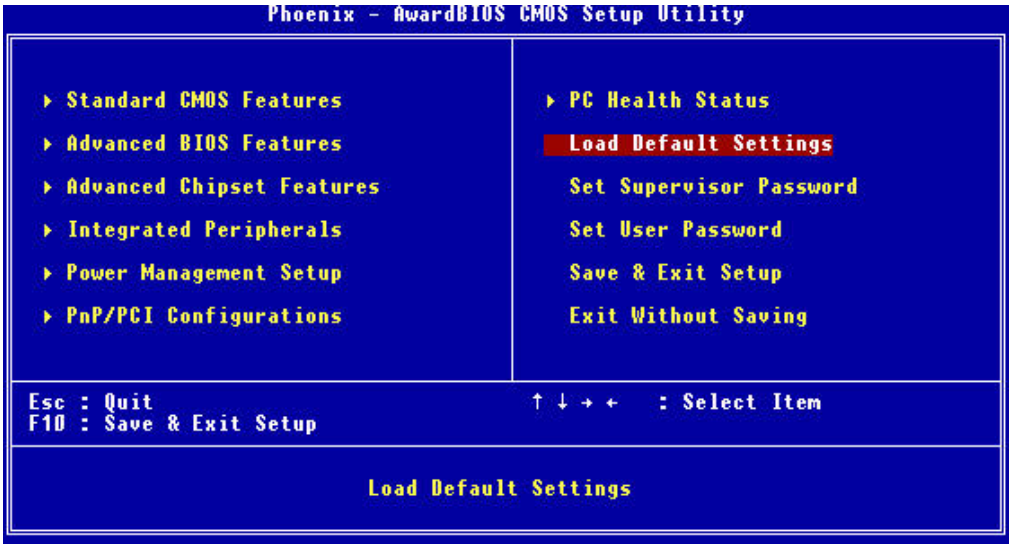

Phoenix - AwardBIOS CMOS Setup Utility
HW Monitor Configuration
Processor Fan Control
Fan1 Start Temperature [30°C/ 86°F]
Fan1 Zone Setting [Processor Zone]
Fan1 Start Speed [50%]
Fan1 Range Value [10°C]
System Fan 1 Control
Fan2 Start Temperature [30°C/ 86°F]
Fan2 Zone Setting [Board Zone]
Fan2 Start Speed [50%]
Fan2 Range Value [10°C]
System Fan 2 Control
Fan3 Start Temperature [30°C/ 86°F]
Fan3 Zone Setting [Remote Zone]
Fan3 Start Speed [50%]
Fan3 Range Value [10°C]
Item Help
Menu Level ▸▸
[Disable Auto Fan3]: Fan always on full. [Temperature]: When the temperature exceeds this limit, the fan speed will be increased according to the algorithm set forth in the Auto Fan Range.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

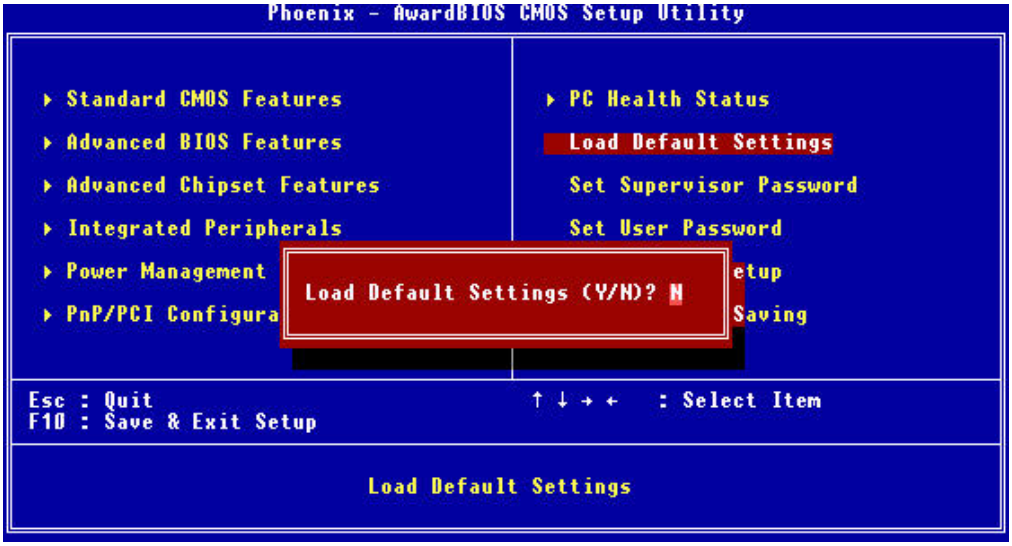

Phoenix - AwardBIOS CMOS Setup Utility
HW Monitor Configuration
Processor Fan Control
Fan1 Start Temperature [30°C/ 86°F]
Fan1 Zone Setting [Processor Zone]
Fan1 Start Speed [50%]
Fan1 Range Value [10°C]
System Fan 1 Control
Fan2 Start Temperature [30°C/ 86°F]
Fan2 Zone Setting [Board Zone]
Fan2 Start Speed [50%]
Fan2 Range Value [10°C]
System Fan 2 Control
Fan3 Start Temperature [30°C/ 86°F]
Fan3 Zone Setting [Remote Zone]
Fan3 Start Speed [50%]
Fan3 Range Value [10°C]
Item Help
Menu Level ▸▸
When in Auto Fan Mode the fan will be assigned to a zone and its PWM duty cycle will be adjusted according to the temperature of the zone.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings


Phoenix - AwardBIOS CMOS Setup Utility
HW Monitor Configuration
Processor Fan Control
Fan1 Start Temperature [30°C/ 86°F]
Fan1 Zone Setting [Processor Zone]
Fan1 Start Speed [50%]
Fan1 Range Value [10°C]
System Fan 1 Control
Fan2 Start Temperature [30°C/ 86°F]
Fan2 Zone Setting [Board Zone]
Fan2 Start Speed [50%]
Fan2 Range Value [10°C]
System Fan 2 Control
Fan3 Start Temperature [30°C/ 86°F]
Fan3 Zone Setting [Remote Zone]
Fan3 Start Speed [50%]
Fan3 Range Value [10°C]
Item Help
Menu Level ▸▸
Specifies the minimum duty cycle for the fan PWM when the measured temperature reaches "Fan3 Start Temperature" setting.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

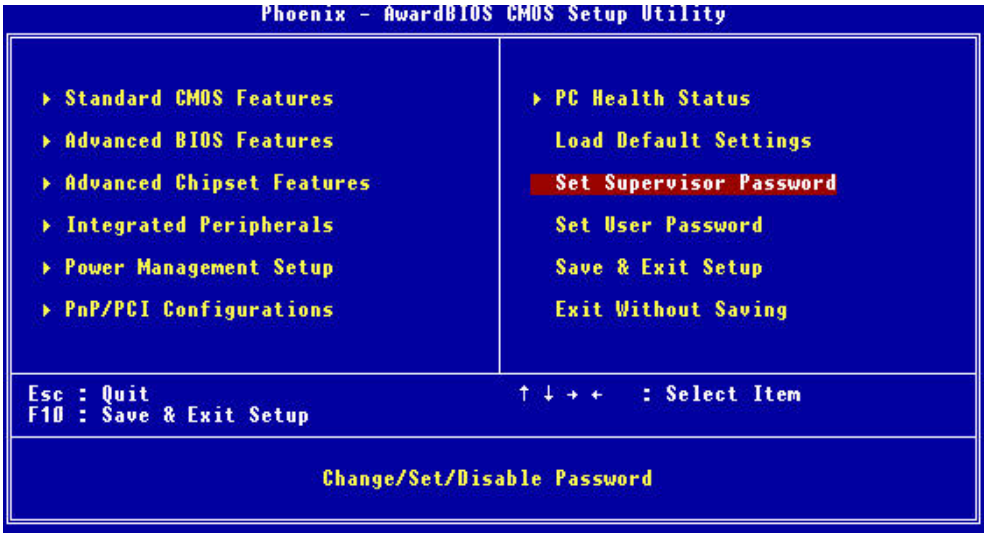

Phoenix - AwardBIOS CMOS Setup Utility
HW Monitor Configuration
Processor Fan Control
Fan1 Start Temperature [30°C/ 86°F]
Fan1 Zone Setting [Processor Zone]
Fan1 Start Speed [50%]
Fan1 Range Value [10°C]
System Fan 1 Control
Fan2 Start Temperature [30°C/ 86°F]
Fan2 Zone Setting [Board Zone]
Fan2 Start Speed [50%]
Fan2 Range Value [10°C]
System Fan 2 Control
Fan3 Start Temperature [30°C/ 86°F]
Fan3 Zone Setting [Remote Zone]
Fan3 Start Speed [50%]
Fan3 Range Value [10°C]
Item Help
Menu Level ▸▸
Between "Fan3 Start Temperature" and "Fan3 Start Temperature"+"Fan3 Range Value"), the PWM duty cycle will increase linearly.
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F7: Default Settings

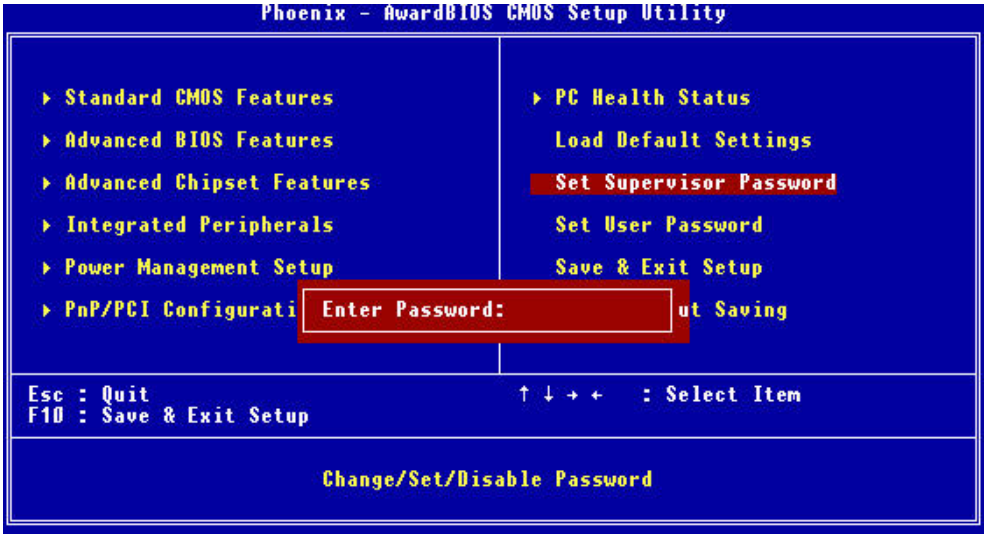
4.3.4.8 Load Default Settings



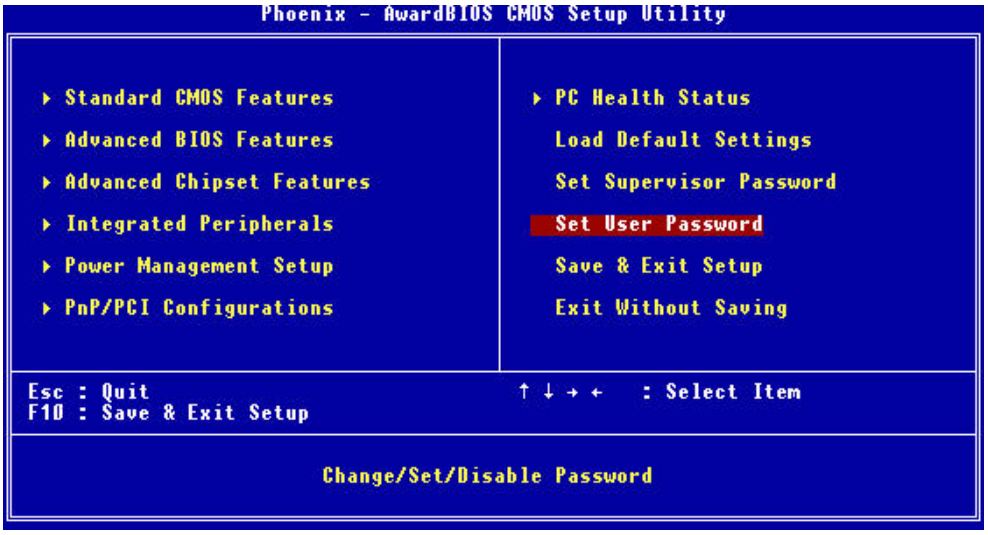


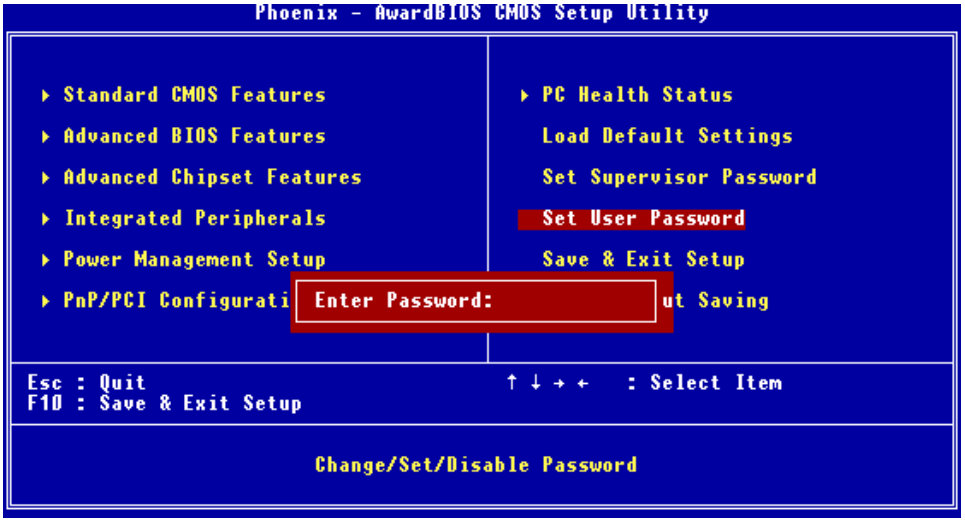
4.3.4.9 Set Supervisor Password



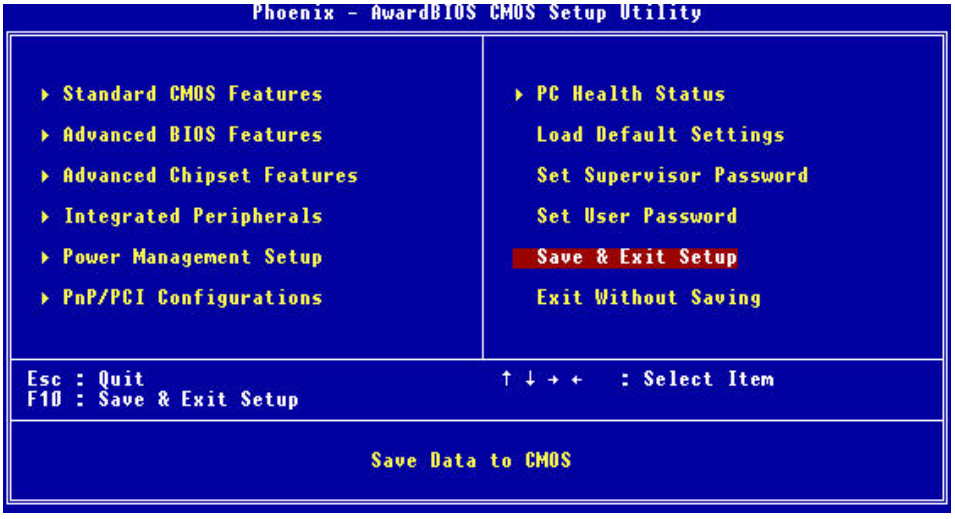


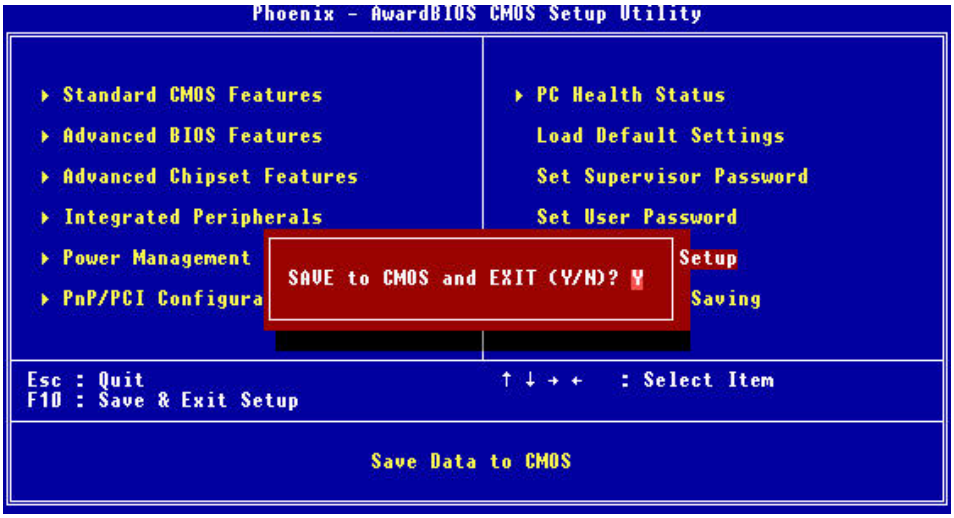
4.3.4.10 Set User Password



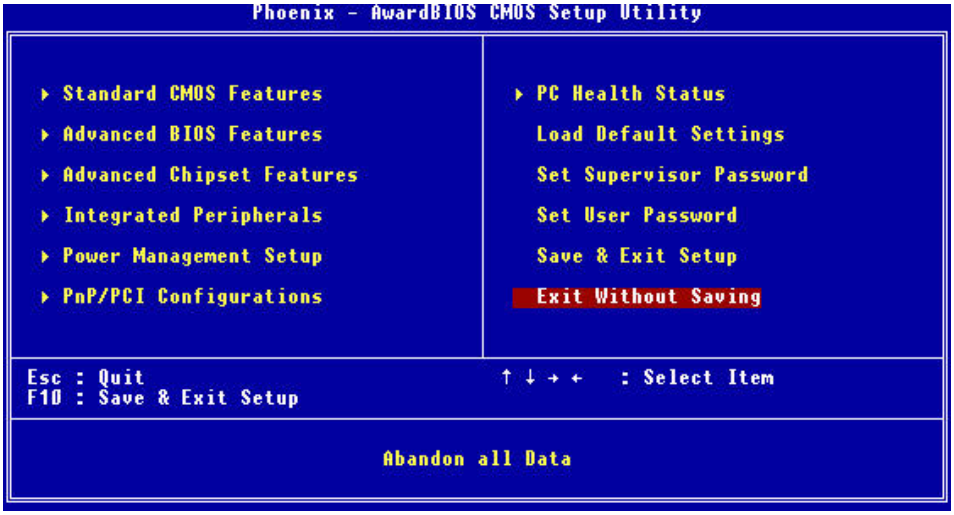


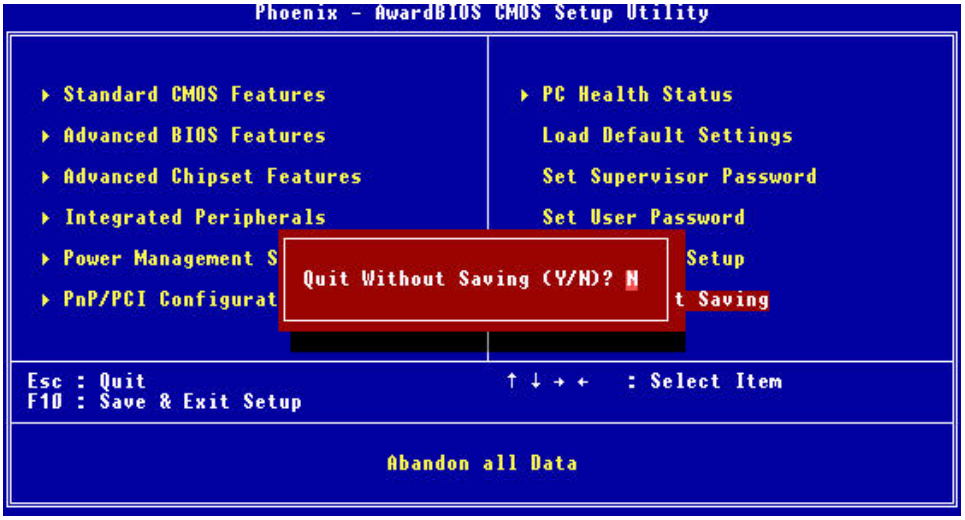
4.3.4.11 Save & Exit Setup





4.3.4.12 Exit Without Saving





4.4 Power Management

Supports APM and ACPI 2.0 with power states S0, S3, S4 (not S4BIOS), S5 and C0, C1, C2, C3.

4.4.1 ACPI Wake-up Support

The next table indicates which events can cause an ACPI wake-up and from which sleep states.

Event	S1	S3	S4	S5
Power Switch	v	v	v	v
RTC alarm	v	v	v	v
PS2 Mouse/Keyboard	v			
USB Device	v	v		
PME	v	v	v	v
WOL	v	v	v	v

4.5 Hardware Monitor and Auto Fan Control

The hardware monitoring values and auto fan control configure was in 'Setup menu -> System Monitor' item.

4.5.1 Hardware Monitor

The LM96000 measures:

- Temperature of two remote diodes and its own die.
- VCCP, 3.3VSBY, 5.0V, and 12V.
- 3 fan tachometer inputs.
- Lithium Cell Battery Voltage

4.5.2 Automatic Fan Control

In Auto Fan Mode, the LM96000 will automatically adjust the PWM duty cycle of the PWM outputs. PWM outputs are assigned to a thermal zone based on the fan configuration registers. It is possible to have more than one PWM output assigned to a thermal zone. For example, PWM outputs 2 and 3, connected to two chassis fans, may both be controlled by thermal zone 2. At any time, the temperature of a zone exceeds its absolute limit, all PWM outputs will go to 100% duty cycle to provide maximum cooling to the system.

4.6 Power LED

LED	State	Indicates
Single color	OFF	The motherboard is powered down or in one of the ACPI sleep states (including S1).
	ON	The motherboard is fully powered up (S0).
	Blinking	The motherboard is fully powered up (S0) with a message waiting (as determined by ACPI TAPI).
Dual Color (Green /Yellow)	OFF	The motherboard is powered down or in ACPI sleep states S4 or S5 (no +5V supply available)
	Green	The motherboard is fully powered up (S0).
	Yellow	The motherboard is in sleep state S1.
	Blinking green	The motherboard is fully powered up (S0) with a message waiting (as determined by ACPI TAPI).

LED	State	Indicates
	Blinking yellow	The motherboard is in sleep state S1 with a message waiting (as determined by ACPI TAPI).

4.7 CPLD

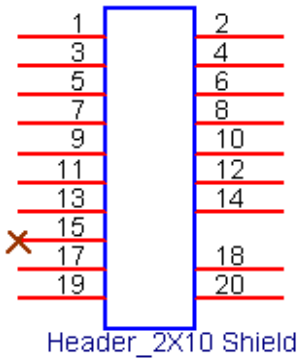
4.7.1 POST Code Display

Support for character-based LCD panel to display BIOS POST messages and other information. Displays have an 8-bit parallel interface. Text for display is the BIOS Port 80 codes in the format: "BIOS Code xx".

This section describes how the LCD character display support is implemented. With the exception of the backlight power pins, the display connector is wired directly to the motherboard port GPIO pins.

The logic in the CPLD is driven purely by software; there is no automatic generation of the interface control signals. In this way, the use of the display is controlled exclusively by software (or BIOS).

The PWM signal from the CPLD requires an inverting low-pass filter in order to correctly drive the contrast voltage to the display.



GPIO Header

4.7.2 BIOS Protection

Support 2 GPIO pins to control the FWH pins TBL# (Top Block Lock) and WP# (Write Protect) to protect the BIOS code.

4.7.3 LAN Controller

Support 2 GPIO pins to Enable/Disable on-board LAN1/LAN2 controller.

4.8 TPM

Pr-allocate 16 byte size I/O from 4700h for TPM module.

4.9 Normal, Configure and Recovery Mode

The motherboard can operate in one of three modes - Normal, Recovery and Configure by jumper setting. Refer to section 1.4 (Configuration) for further information.

4.9.1 Normal Mode

This is the factory default position the jumper should be in for normal operation of the motherboard.

4.9.2 Configure Mode

The Configure mode forces the BIOS into Setup with the manufacturer defaults loaded. The mode should be returned to normal before re-starting.

4.9.3 Recovery Mode

The Recovery mode expects a recovery disk in floppy disk drive A and will wait until one is found before performing the recovery operation.

4.10 Update and Recovery Diskette

4.10.1 Update Diskette

The upgrade process requires two files:

- The new BIOS file (e.g., newbios.bin)
- The upgrade utility (awdflash.exe).

Although it may be possible to use different media for the files, this manual assumes that you are using a floppy disk. Prepare for the upgrade process as follows:

- Create a bootable floppy disk.
- Transfer the two Award files listed above onto the diskette.
- Check and configure the BIOS write-protection jumper.

You are now ready to start the upgrade process.

CAUTION

Do not interrupt the upgrade program while it is running! Interrupting the program leaves the system without BIOS and renders the system unusable. If the power goes off during the few seconds that the program is running, the system will be left without a working BIOS and it will be necessary to install a correctly programmed flash EPROM.

4.10.2 Recovery Diskette

The recovery diskette should be used to recover a system BIOS when the motherboard no longer operates after a failed BIOS update operation. The process is described below.

- Create a bootable floppy disk as the Update section.
- Create a AUTOEXEC.BAT and following command included ‘AWDFLASH ****.BIN /py/sn/wb/r’
- Check and configure the operation mode jumper to recovery mode.

4.11 Tamper Detection

When detecting the tamper signal low, BIOS can be configured to display a warning message or to require a password at the next boot. Since the lithium cell powers the logic, the tamper detection continues to operate even if the board is un-powered.

4.12 OEM Features

4.12.1 POST Logo Change

CBROM.exe is the Award BIOS ROM combination utility. CBROM runs at a DOS prompt. Use the following command to change a full-screen logo to your BIOS bin file.

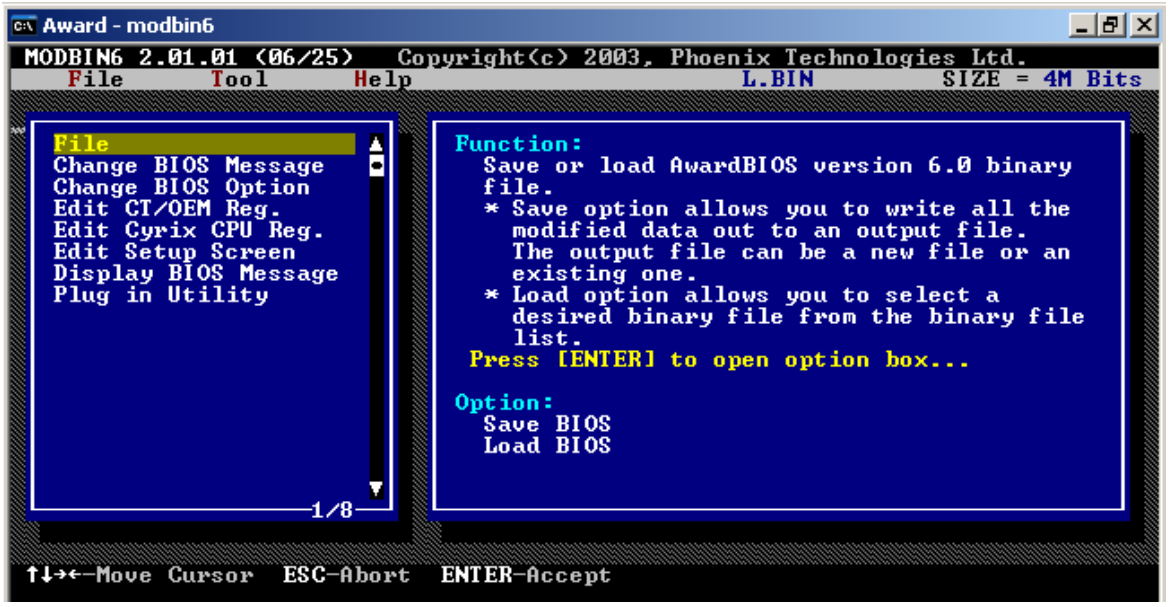
Cbrom AAA.bin /logo test.bmp

> **NOTE**
>
> The full-screen logo file must be 640X464 pixels with 16 colors BMP format.

4.12.2 CMOS Default Change

The MODBIN6.EXE is the utility that runs at a DOS prompt for binary code manipulation. It allows selection of customized default CMOS (BIOS setup) settings.The process is described below:

Execute the MODBIN6.exe

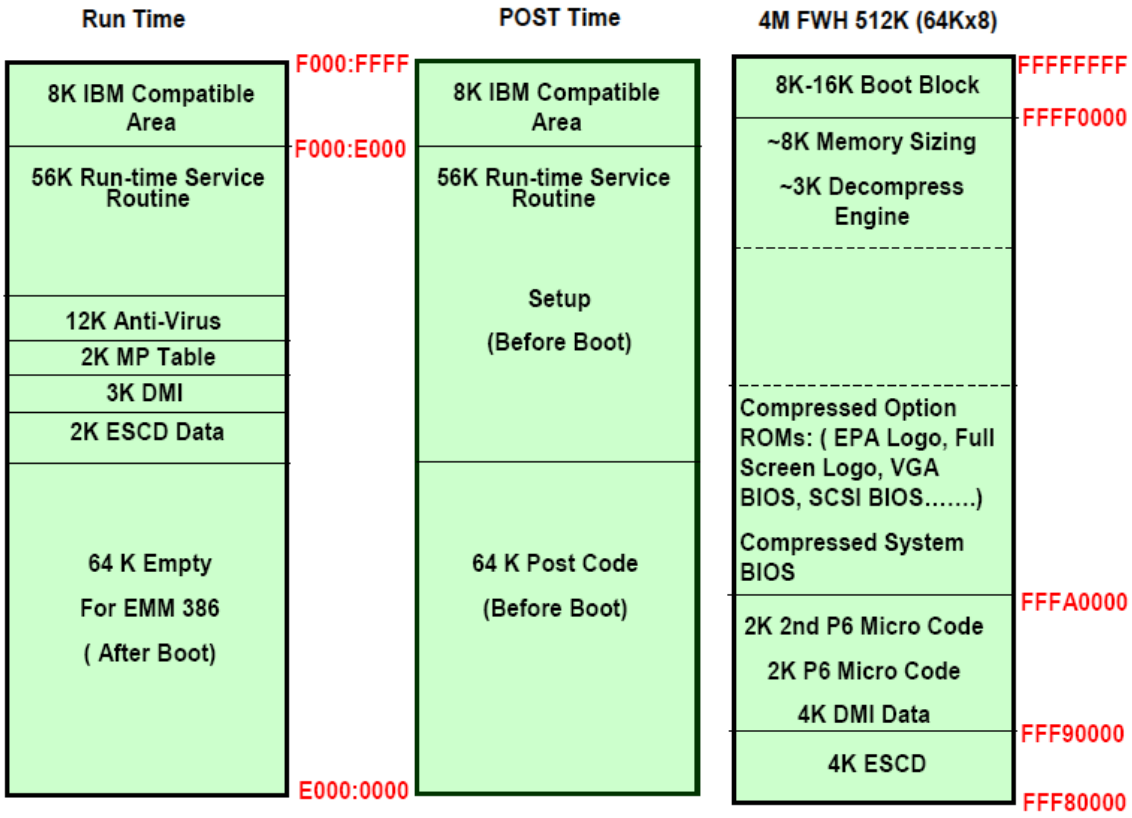

Award - modbin6
MODBIN6 2.01.01 (06/25) Copyright(c) 2003, Phoenix Technologies Ltd.
File Tool Help L.BIN SIZE = 4M Bits
File
Change BIOS Message
Change BIOS Option
Edit CT/OEM Reg.
Edit Cyrix CPU Reg.
Edit Setup Screen
Display BIOS Message
Plug in Utility
1/8
Function:
Save or load AwardBIOS version 6.0 binary file.
* Save option allows you to write all the modified data out to an output file. The output file can be a new file or an existing one.
* Load option allows you to select a desired binary file from the binary file list.
Press [ENTER] to open option box...
Option:
Save BIOS
Load BIOS
↑↓→←-Move Cursor ESC-Abort ENTER-Accept

- Load the BIOS bin file by the ‘File’ option.
- Change the ‘Edit Setup Screen’ to change the default settings.
- Save the modified BIOS file by ‘File’ option.

4.13 PXE

BIOS locate and configure all PXE-capable boot devices (UNDI Option ROMs) in the system follow the BIOS Boot Specification (BBS) v1.01or later to support network adapters as boot devices.

4.14 BIOS Flash Usage Map



4.15 Processor Microcode Support

IA32 processors have the capability of correcting specific errata through the loading of an Intel-supplied data block (i.e. microcode update). Below table list the microcode that BIOS store in flash, and will load it into each processor during POST.

Name	Revision	CPUID	Stepping
M9DF4304	04	F43	N-0
M9DF4112	12	F41	E-0
M0DF3702	02	F37	C-1
M1DF3414	14	F34	D-0
M0DF320A	0A	F32	B-1
M10F252C	2C	F25	M-0

4.16 SMBIOS

The BIOS provides support for the SMBIOS specification to create a standardized interface for manageable attributes that are expected to be supported by DMI-enabled computer systems. The BIOS provides this interface via data structures through which the system attributes are reported. Using SMBIOS, a system administrator can obtain the types, capabilities, operational status, installation date and other information about the system components.

The following table describes the types of SMBIOS structures supported by the system BIOS.

Item	SMBIOS Data		Expected Result
1	Type 00: BIOS Information	BIOS Vendor	Phoenix Technologies, LTD
		BIOS Version	4C7R2BXX
		Starting Addr Seg	E000h
		BIOS Release Date	MM/DD/YYYY
		BIOS ROM Size	512K
2	Type 01: System Information	Manufacturer	‘RadiSys‘
		Product Name	‘Endura KP915GV‘
		Version	‘ ‘
		Serial Number	‘ ‘
		UUID	FFFFFFFF-FFFFFFFF FFFFFFFF-FFFFFFFF
3	Type 02: Baseboard Information	Manufacturer	‘Foxconn‘
		Product	‘Endura KP915GV‘
		Version	‘ ‘
		Serial Number	‘50bbcccddddd‘
4	Type 03: System Enclosure	Manufacturer	‘RadiSys‘
		Type	Desktop
		Version	‘ ‘
		Serial Number	‘ ‘
		Asset Tag Number	‘ ‘
5	Type 04: Processor Information	Socket Designation	LGA 775
		Processor Type	Central Processor
		Processor Family	Other
		Processor Manufacturer	Intel
		Processor ID	Depend on CPU
		Processor Version	Depend on CPU
		Voltage	Depend on CPU
		External Clock	Depend on CPU
		Max Speed	Depend on CPU
		Current Speed	Depend on CPU
		Status	Depend on CPU
		Processor Upgrade	Other
6	Type 07: Cache Information	Socket Designation	L1-Cache
		Cache Configuration	Depend on CPU
		Maximum Cache Size	Depend on CPU
		Installed Size	Depend on CPU
		Supported SRAM Type	Depend on CPU
		Current SRAM Type	Depend on CPU
		Cache Speed	Depend on CPU
		Error Correction Type	03h(None)

Item	SMBIOS Data		Expected Result
		System Cache Type	Data
		Associativity	Depend on CPU
7	Type 07: Cache Information	Socket Designation	L2-Cache
		Cache Configuration	Depend on CPU
		Maximum Cache Size	Depend on CPU
		Installed Size	Depend on CPU
		Supported SRAM Type	Depend on CPU
		Current SRAM Type	Depend on CPU
		Cache Speed	Depend on CPU
		Error Correction Type	03h(None)
		System Cache Type	Unified
		Associativity	Depend on CPU
8	Type 09: System Slots	Slot Designation	PCI0
		Slot Type:	PCI
		Slot Data Bus Width:	32Bit
		Current Usage:	Available
		Slot Length:	Short Length
		Slot ID:	001
		Slot Characteristics:	Provides 3.3V
		Slot Characteristics 2:	PME enable
9	Type 09: System Slots	Slot Designation	PCI1
		Slot Type:	PCI
		Slot Data Bus Width:	32Bit
		Current Usage:	Available
		Slot Length:	Short Length
		Slot ID:	002
		Slot Characteristics:	Provides 3.3V
		Slot Characteristics 2:	PME enable
10	Type 09: System Slots	Slot Designation	PCI-E-0
		Slot Type:	Other
		Slot Data Bus Width:	Other
		Current Usage:	Available
		Slot Length:	Other
		Slot ID:	0003
		Slot Characteristics:	Provides 3.3V
		Slot Characteristics 2:	PME enable
11	Type 09: System Slots	Slot Designation	PCI-E-1
		Slot Type:	Other
		Slot Data Bus Width:	Other
		Current Usage:	Available

Item	SMBIOS Data		Expected Result
		Slot Length:	Other
		Slot ID:	0004
		Slot Characteristics:	Provides 3.3V
		Slot Characteristics 2:	PME enable
12	Type 16 Physical Memory Array	Location	03h(System board or motherboard)
		Use	03h(System Memory)
		Memory Error Correction	03h(None)
		Memory Capacity	Depend on MEM
		Memory Error Information Handle	Unknown
		Number of Memory Devices	0002
13	Type 17 Memory Device	Memory Error Information Handle	Unknown
		Total Width	Depend on MEM
		Data Width	Depend on MEM
		Size	Depend on MEM
		Form Factor	09h(DIMM)
		Device Set	00
		Device Locator	A0
		Bank Locator	Bank 0/1
		Memory Type	0Fh(SDRAM)
		Type Detail	0080h(Synchronous)
14	Type 17 Memory Device	Memory Error Information Handle	Unknown
		Total Width	Depend on MEM
		Data Width	Depend on MEM
		Size	Depend on MEM
		Form Factor	09h(DIMM)
		Device Set	00
		Device Locator	B0
		Bank Locator	Bank 2/3
		Memory Type	0Fh(SDRAM)
		Type Detail	0080h(Synchronous)
15	Type 17 Memory Device	Memory Error Information Handle	Unknown
		Total Width	Depend on MEM
		Data Width	Depend on MEM
		Size	Depend on MEM
		Form Factor	09h(DIMM)
		Device Set	00
		Device Locator	A1

Item	SMBIOS Data		Expected Result
		Bank Locator	Bank 4/5
		Memory Type	0Fh(SDRAM)
		Type Detail	0080h(Synchronous)
16	Type 17 Memory Device	Memory Error Information Handle	Unknown
		Total Width	Depend on MEM
		Data Width	Depend on MEM
		Size	Depend on MEM
		Form Factor	09h(DIMM)
		Device Set	00
		Device Locator	B1
		Bank Locator	Bank 6/7
		Memory Type	0Fh(SDRAM)
		Type Detail	0080h(Synchronous)
17	Type 19 Memory Array Mapped Address	Starting Address	Depend on MEM
		Ending Address	Depend on MEM
		Partition Width	Depend on MEM
18	Type 20 Memory Device Mapped Address	Starting Address	Depend on MEM
		Ending Address	Depend on MEM
		Partition Row Position	Depend on MEM
		Interleave Position	Depend on MEM
		Interleaved Data Depth	Depend on MEM
19	Type 20 Memory Device Mapped Address	Starting Address	Depend on MEM
		Ending Address	Depend on MEM
		Partition Row Position	Depend on MEM
		Interleave Position	Depend on MEM
		Interleaved Data Depth	Depend on MEM
20	Type 20 Memory Device Mapped Address	Starting Address	Depend on MEM
		Ending Address	Depend on MEM
		Partition Row Position	Depend on MEM
		Interleave Position	Depend on MEM
		Interleaved Data Depth	Depend on MEM
21	Type 20 Memory Device Mapped Address	Starting Address	Depend on MEM
		Ending Address	Depend on MEM
		Partition Row Position	Depend on MEM
		Interleave Position	Depend on MEM
		Interleaved Data Depth	Depend on MEM
22	Type 32 System Boot Information	Boot status	00

Item	SMBIOS Data		Expected Result
23	Type 127: End-of-Table		

4.17 Post Code Technical Description

POST Code	Description
CFh	Test CMOS R/W functionality.
C0h	Early chipset initialization: -Disable shadow RAM -Disable L2 cache (socket 7 or below) -Program basic chipset registers
C1h	Detect memory -Auto-detection of DRAM size, type and ECC. -Auto-detection of L2 cache (socket 7 or below)
C3h	Expand compressed BIOS code to DRAM
C5h	Call chipset hook to copy BIOS back to E000 & F000 shadow RAM.
01h	Expand the Xgroup codes locating in physical address 1000:0
03h	Initial Superio_Early_Init switch.
05h	1. Blank out screen 2. Clear CMOS error flag
07h	1. Clear 8042 interface 2. Initialize 8042 self-test
08h	Enable keyboard interface.
0Ah	Auto detect ports for keyboard & mouse followed by a port & interface swap (optional).
0Eh	Test F000h segment shadow to see whether it is R/W-able or not. If test fails, keep beeping the speaker.
10h	Auto detect flash type to load appropriate flash R/W codes into the run time area in F000 for ESCD & DMI support.
12h	Use walking 1's algorithm to check out interface in CMOS circuitry. Also set real-time clock power status, and then check for override.
14h	Program chipset default values into chipset.
16h	Initial Early_Init_Onboard_Generator switch.
18h	Detect CPU information including brand, SMI type and CPU level.
1Bh	Initial interrupts vector table. If no special specified, all H/W interrupts are directed to SPURIOUS_INT_HDLR & S/W interrupts to SPURIOUS_soft_HDLR.
1Dh	Initial EARLY_PM_INIT switch.
1Fh	Load keyboard matrix (notebook platform)
21h	HPM initialization (notebook platform)

POST Code	Description
23h	Check validity of RTC value: e.g. a value of 5Ah is an invalid value for RTC minute. Load CMOS settings into BIOS stack. If CMOS checksum fails, use default value instead. Prepare BIOS resource map for PCI & PnP use. If ESCD is valid, take into consideration of the ESCD's legacy information. Onboard clock generator initialization. Disable respective clock resource to empty PCI & DIMM slots. Early PCI initialization: -Enumerate PCI bus number -Assign memory & I/O resource -Search for a valid VGA device & VGA BIOS, and put it into C000:0.
27h	Initialize INT 09 buffer
29h	Program CPU internal MTRR (P6 & PII) for 0-640K memory address. Initialize the APIC for Pentium class CPU. Program early chipset according to CMOS setup. Example: onboard IDE controller. Measure CPU speed. Invoke video BIOS.
2Dh	Initialize multi-language Put information on screen display, including Award title, CPU type, CPU speed
3Ch	Test 8254
3Eh	Test 8259 interrupt mask bits for channel 1.
40h	Test 8259 interrupt mask bits for channel 2.
43h	Test 8259 functionality.
47h	Initialize EISA slot
49h	Calculate total memory by testing the last double word of each 64K page. Program writes allocation for AMD K5 CPU.
4Eh	Program MTRR of M1 CPU Initialize L2 cache for P6 class CPU & program CPU with proper cacheable range. Initialize the APIC for P6 class CPU. On MP platform, adjust the cacheable range to smaller one in case the cacheable ranges between each CPU are not identical.
50h	Initialize USB
52h	Test all memory (clear all extended memory to 0)
55h	Display number of processors (multi-processor platform)
57h	Display PnP logo Early ISA PnP initialization -Assign CSN to every ISA PnP device.
59h	Initialize the combined Trend Anti-Virus code.
5Bh	(Optional Feature) Show message for entering AWDFLASH.EXE from FDD (optional)
5Dh	Initialize Init_Onboard_Super_IO switch. Initialize Init_Onboard_AUDIO switch.
60h	Okay to enter Setup utility; i.e. not until this POST stage can users enter the CMOS setup utility.
65h	Initialize PS/2 Mouse
67h	Prepare memory size information for function call: INT 15h ax=E820h
69h	Turn on L2 cache
6Bh	Program chipset registers according to items described in Setup & Auto-configuration table.
6Dh	Assign resources to all ISA PnP devices.
6Fh	Initialize floppy controller

POST Code	Description
75h	Detect & install all IDE devices: HDD, LS120, ZIP, CDROM…
77h	Detect serial ports & parallel ports.
7Ah	Detect & install co-processor
7Fh	Switch back to text mode if full screen logo is supported.
82h	Call chipset power management hook. If password is set, ask for password.
83h	Save all data in stack back to CMOS
84h	Initialize ISA PnP boot devices
85h	USB final Initialization.
93h	Read HDD boot sector information for Trend Anti-Virus code
94h	Enable L2 cache Program boot up speed Chipset final initialization. Power management final initialization Clear screen & display summary table.
95h	Program daylight saving Update keyboard LED & typematic rate
96h	Build MP table Build & update ESCD Set CMOS century to 20h or 19h Load CMOS time into DOS timer tick Build MSIRQ routing table.
FFh	Boot attempt (INT 19h)

4.18 POST Beep

- A single long beep followed by two short beeps. It indicates that a video error has occurred and the BIOS cannot initialize the video screen to display any additional information.
- A single long beep repeatedly. This indicates that a DRAM error has occurred.

4.19 SMBus Device Configuration

Device Name	Address	Description
Channel A DIMM1	A0	DDR2 Memory
Channel A DIMM2	A8	DDR2 Memory
Channel B DIMM1	A4	DDR2 Memory
Channel B DIMM2	AC	DDR2 Memory
ICS 954101AFT	D2 & D3	CK410E
NS LM96000	5C	Hardware Monitor

5 Customer Support

RadiSys Online Support can be found at www.radisys.com and includes device drivers, BIOS updates, support software and documentation. See the Manuals, Drivers & BIOS section.

The next table displays online specifications and reference material:

Table 7. References

Specification	Description	Location
ACPI	Advanced Configuration and Power Interface specification	www.acpi.info
AGP	Advanced Graphics Port Interface Specification	www.agpforum.org
APM	Advanced Power Management specification	www.microsoft.com/hwdev/archive/BUSBIOS/amp_12.asp
Intel 915G Chipset	Intel 915G chipset datasheet	http://developer.intel.com/design/chipsets/915g/index.htm
Intel 915GV Chipset	Intel 915GV chipset datasheet	http://developer.intel.com/design/chipsets/915gv/index.htm
Intel Celeron processor	Intel Celeron processor datasheet	http://developer.intel.com/design/celeron
Intel Pentium 4 processor	Intel Pentium 4 processor datasheet	http://developer.intel.com/design/pentium4
ATX, microATX	Form factor specifications	www.formfactors.org
PCI	PCI local bus specification	www.pcisig.com
DDR SDRAM DIMMs	Memory module specifications	http://developer.intel.com/technology/memory/ http://www.jedec.org/
SMBus	System management bus	www.smbus.org
USB	Universal Serial Bus specification	www.usb.org/developers
VESA	Video Electronics Standards Association	www.vesa.org

A Technical Reference

A.1 I/O Map

Table 8. I/O Map

Address (hex)*	Description
0000 – 000F	DMA controller 1
0020 – 0021	Interrupt controller 1
002E – 002F	SIO control registers
0040 – 0043	Timer counter
0060 – 0064	Keyboard and mouse controller
0062, 0066	Motherboard control registers
0070 – 0071	RTC and CMOS RAM
0080 – 008F	DMA controller page registers (for channels 1 and 2)
0092	PC compatible Port 92 (fast A20 and PIC)
00A0 – 00A1	Interrupt controller 2
00B2 – 00B3	Advanced power management (APM) control registers
00C0 – 00DF	DMA controller 2
00F0	Floating point error control
0170 – 0177	Secondary IDE controller
01F0 – 01F7	Primary IDE controller
0278 –027F	Parallel port, LPT2
02E8 – 02EF	COM4 serial port
02F8 – 02FF	COM2 serial port
0374 – 0376	Secondary IDE controller
0378 –037F	Parallel port, LPT1
x3B0 – x3BB	VGA controller
x3C0 – x3CF	EGA controller registers
x3D4 – x3DA	CGA controller registers
03F0 – 03F5	Flexible diskette controller
03F6 – 03F7	Primary IDE controller
03E8 – 03EF	COM3 serial port
03F8 – 03FF	COM1 serial port
04D0 – 04D1	Interrupt controller
0678 – 067A	ECP registers for parallel port LPT2
0778 – 077A	ECP registers for parallel port LPT1
0CF8 – 0CFF	PCI configuration address and data registers
1000 – 105F	ACPI registers
1060 – 107F	TCO controller
1200 – 12FF	AC97 audio mixer

Table 8. I/O Map

Address (hex)*	Description
1300 – 133F	AC97 audio master
1800 – 182F	SIO GPIO and control logic
FFA0 – FFA7	Primary IDE bus master registers
FFA8 – FFAF	Secondary IDE bus master registers
Dynamically assigned	USB controller (four) (32 locations on 32-byte boundary)
Dynamically assigned	SMBus controller (16 locations on 16-byte boundary)
Dynamically assigned	LAN controllers (two) (4096 locations on a 4096-byte boundary)

* An 'x' prefix for the address indicates that only the low-order 10 address bits are decoded.

A.2 PCI Interrupt Allocation

In order to share PCI interrupts efficiently, the routing of the PCI interrupts INTA - INTD to the motherboard PCI interrupts PIRQE – PIRQH are rotated for each slot. Thus the PCI card INTA signals for the PCI slots are spread across these four motherboard inputs. Interrupt routing for the riser slots is determined by the riser design.

Table 9. PCI Interrupt Allocation

Device	PIRQA	PIRQB	PIRQC	PIRQD	PIRQE	PIRQF	PIRQG	PIRQH
Slot 1 (AGP4X)	INTA	INTB	–	–	–	–	–	–
Slot 2 (PCI 2.2)	–	–	–	–	INTA	INTB	INTC	INTD
Slot 3 (PCI 2.2)	–	–	–	–	INTD	INTA	INTB	INTC
Slot 4 (PCI 2.2)	–	–	–	–	INTC	INTD	INTA	INTB
VGA controller	INTA	–	–	–	–	–	–	–
Ethernet controller 1	INTA	–	–	–	–	–	–	–
Ethernet controller 2	–	INTA	–	–	–	–	–	–
USB UHCI controller 1	INTA	–	–	–	–	–	–	–
USB UHCI controller 2	–	–	–	INTB	–	–	–	–
USB UHCI controller 3	–	–	INTC	–	–	–	–	–
USB EHCI controller	–	–	–	–	–	–	–	INTD
SMBus controller	–	INTB	–	–	–	–	–	–
AC97 controller	–	INTB	–	–	–	–	–	–

Example. From the previous table, the INTA interrupt from a card plugged into slot 2 would be routed to the motherboard PIRQE.

A.3 PCI Device Assignments

Table 10. PCI Device Assignments

Device	IDSEL	Bus Number	Device Number	Function Number
Chipset host bridge and memory controller	–	0	0	0
AGP bridge	–	0	1	0
Graphics controller	–	0	2	0
PCI bridge	–	0	30	0
LPC bridge (Includes DMA, timers, PIC, APIC, RTC, power & system management, GPIO)	–	0	31	0
IDE controller	–	0	31	1
SMBus controller	–	0	31	3
AC97 audio controller	–	0	31	5
USB UHCI controller 1	–	0	29	0
USB UHCI controller 2	–	0	29	1
USB UHCI controller 3	–	0	29	2
USB EHCI controller	–	0	29	7
Slot 1 (AGP4X)	AD16	2	0	–
Slot 2 (PCI 2.2)	AD17	2	1	–
Slot 3 (PCI 2.2)	AD18	2	2	–
Slot 4 (PCI 2.2)	AD19	2	3	–
Slot 5 (PCI 2.2, via riser only)	AD20	2	4	–
Slot 6 (PCI 2.2, via riser only)	AD21	2	5	–
Ethernet controller 1	AD23	2	7	0
Ethernet controller 2	AD24	2	8	0

The PCI slots and the Ethernet controller are behind a virtual bridge to PCI bus 2 implemented by the chipset ICH4. An AGP card, when present, resides on PCI bus 1.

A.4 SMBus Resource Allocation

Table 11. SMBus Resource Allocation

Address	Description
0101 110X	System management controller (LM85)
1010 000X	Memory module 1
1010 001X	Memory module 2
1101 001X	Clock synthesizer

A.5 ISA Interrupt Allocation

While the motherboard does not include an ISA bus, it includes an ISA-compatible interrupt controller (PIC) in order to be compatible with AT standard architecture. The interrupts are allocated as described in the next table.

Table 12. ISA Interrupt Allocation

Interrupt	Description
IRQ0	System Timer
IRQ1	Keyboard Controller
IRQ2	Cascade interrupt
IRQ3	COM2, COM1 or unassigned
IRQ4	COM1, COM2 or unassigned
IRQ5	Parallel port or unassigned
IRQ6	Floppy
IRQ7	Printer port or unassigned
IRQ8	Real time clock/CMOS RAM
IRQ9	ACPI SCI (when configured for ACPI operating system)
IRQ10	Unassigned
IRQ11	Unassigned
IRQ12	PS/2 mouse or unassigned
IRQ13	Floating point unit
IRQ14	Primary IDE or unassigned
IRQ15	Secondary IDE or unassigned
NMI	PCI PERR and SERR signals

A.6 ISA DMA Channel Allocation

While the motherboard does not support an ISA bus, it includes an ISA-compatible DMA controller in order to be compatible with AT standard architecture. The DMA channels are allocated as described in the next table.

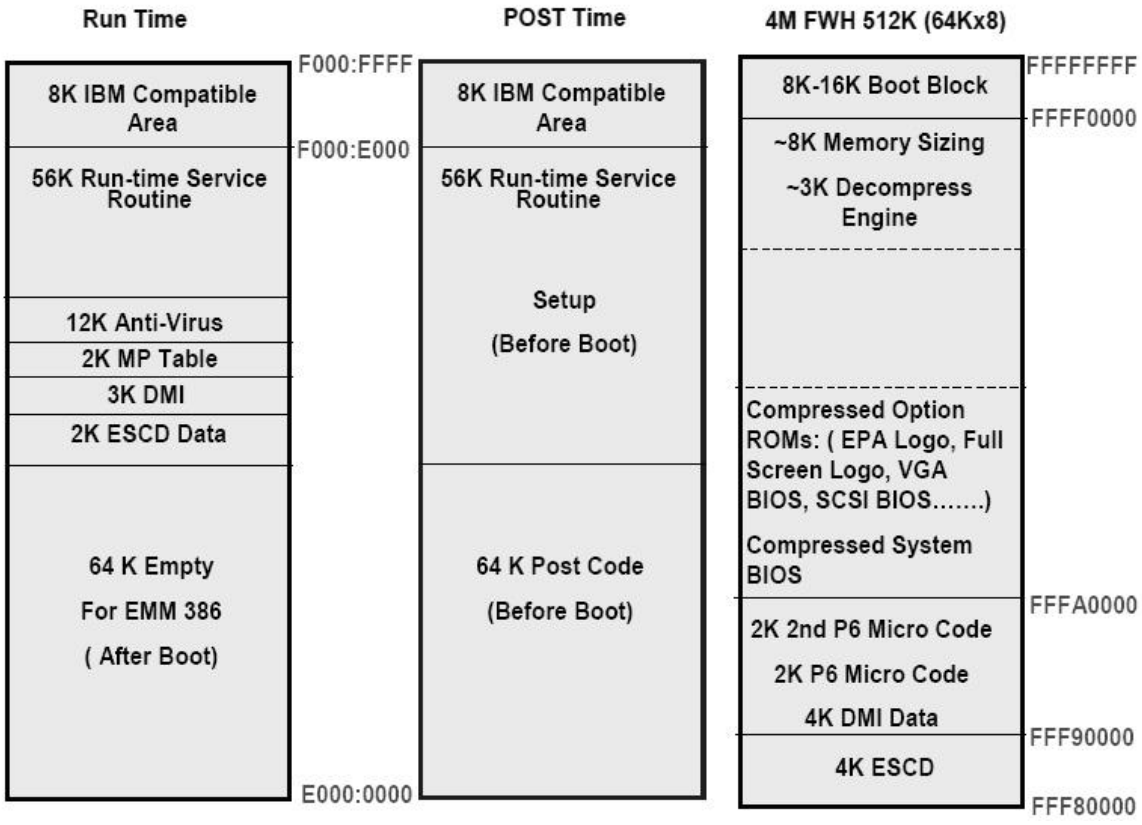
Table 13. ISA DMA Channel Allocation

DMA Channel	Description
Channel 0	Unassigned 8-bit channel
Channel 1	Unassigned 8-bit channel
Channel 2	Floppy controller or unassigned 8-bit channel
Channel 3	ECP parallel port or unassigned 8-bit channel
Channel 4	Cascade channel
Channel 5	Unassigned 16-bit channel
Channel 6	Unassigned 16-bit channel
Channel 7	Unassigned 16-bit channel

A.7 BIOS Organization

The BIOS ROM is a 4or 8Mbit device containing eight or sixteen symmetrical 64KB blocks. The next figure shows how the ROM stores code and control information. The addresses shown refer to the ROM image at the top of the 4GB-address space. Note that the system BIOS segment is compressed in this image. When the BIOS runs, the code is uncompressed in real-time and the resulting code and data image is found at physical address 0E0000h through 0FFFFFh.

Figure 11. BIOS ROM Addresses



B Control Registers

Notes

- The following abbreviations are used in register descriptions:
  R=Read RO=Read only R/W=Read/Write W=Write only
- The MSB (Most Significant Bit) is listed first.

B.1 Index Register

7	6	5	4	3	2	1	0
Version				Index			
RO	RO	RO	RO	R/W	R/W	R/W	R/W

I/O location: 062h
Default: *vvvv*1010b

Version	A read-only field containing the software version number for the logic.
0001	Version 1
0010	Version 2
Index	Value description.
0000	Watchdog Control
0000	Watchdog Kick
0000	Watchdog Status
0001	Watchdog Timeout Period
0010	General Purpose I/O Port 1
0011	General Purpose I/O Port 2 and Control
1000	PWM Control
1001	Part Number, low digits
1010	Processor Identification
1011	Part Number, high digits

B.2 Watchdog Control

7	6	5	4	3	2	1	0
Prescale				RES	SMI	WEN	0
W	W	W	W	W	W	W	W

I/O location: 066h
Index: 0
Default: 00000000b

Prescale	4-bit value to set the watchdog counter period
0..15	16..1s period (a value of 1010b gives a period of 6 seconds)
1	Description
RES	Reset after second timeout:
0	No reset
1	Force system reset after second watchdog timeout
SMI	Generate SMI after first timeout:[8]
0	No SMI
1	Generate SMI after first watchdog timeout
WEN	Watchdog enable:
0	Disable watchdog timer
1	Enable and start watchdog timer

[8] Use of this feature normally requires a custom BIOS – contact RadiSys for more information. The standard BIOS does not route the SMI and thus ignores the event – causing a system reset after the second timeout unless the timer is restarted.

B.3 Watchdog Kick

7	6	5	4	3	2	1	0
Don't care							1
W	W	W	W	W	W	W	W

I/O location: 066h
Index 0
Default: 00000000b

B.4 Watchdog Status

7	6	5	4	3	2	1	0
Prescale				TO2	TO1	WEN	0
RO	RO	RO	RO	RO	RO	RO	RO

I/O location: 066h
Index: 0
Default: N/A

Prescale	4-bit value to set counter period (copy of data written)	
TOC1	First timeout:	
	0	First timeout has not occurred
	1	Timer has expired at least once
TOC2	Second timeout:	
	0	Second timeout has not occurred
	1	Timer has expired at least once
WEN	Timer enable:	
0	Timer is disabled	

1 Timer is enabled and counting

B.5 Watchdog Timeout Period

7	6	5	4	3	2	1	0
Watchdog timeout period							
R/W	R/W	R/W	R/W	R/W	R/W	R/W	R/W

I/O location: 066h
Index 1
Default: 11111111b

Timeout period

0	Do not use (causes immediate timeout)
1–255	Timeout period in units of 1 x prescale value seconds

B.6 General Purpose I/O Port 1

7	6	5	4	3	2	1	0
PI7	PI6	PI5	PI4	PI3	PI2	PI1	PI0
R/W	R/W	R/W	R/W	R/W	R/W	R/W	R/W

I/O location: 066h
Index: 2
Default: 00000000b

P17–P10, GPIO Port 1 data:
When programmed as an output, the GPIO port 1 bit follows the value written into this register and reads reflect the value written.

When programmed as inputs, writes are ignored and a read follows the state of the GPIO port 1 signal. Direction control is via the GPIO port 2 and control register.

B.7 General Purpose I/O Port 2 and Control

7	6	5	4	3	2	1	0
D201	D157	D104	P24	P23	P22	P21	P20
R/W	R/W	R/W [9]	R/W	R/W	R/W	R/W	R/W

[9] Controller versions up to and including 2 do not support reading this bit

I/O location: 066h
Index: 3
Default: 00000000b

P21 – P20, GPIO Port 2 data:
When programmed as an output, the GPIO port 2 bit follows the value written into this register and reads reflect the value written. When programmed as inputs, writes are ignored and a read follows the state of the GPIO port 2 signal. Direction control is via the D201 control.

P22, GPIO Port 2 data:
This bit is output only. GPIO port 2 bit 2 follows the value written into this register and reads reflect the value written.

P24 - P23, GPIO Port 2 data:

These bits are input only. Writes to these bits have no effect; reads reflect the state of the GPIO port 2 bits 4 and 3 respectively.

D104, GPIO Port 1 bits 0 – 4 direction control:

GPIO bits 10 – 14 are inputs

GPIO bits 10 – 14 are outputs

D157, GPIO Port 1 bits 5 – 7 direction control:

GPIO bits 15 – 17 are inputs

GPIO bits 15 – 17 are outputs

D201, GPIO Port 2 bits 0 – 1 direction control:

GPIO bits 20 – 21 are inputs

GPIO bits 20 – 21 are outputs

B.8 PWM Control

7	6	5	4	3	2	1	0
Reserved					PWM control		
R/W	R/W	R/W	R/W	R/W	R/W	R/W	R/W

I/O location: 066h
Index: 8
Default: 00000000b

PWM Control Determines the pulse width of the PWM output.

B.9 Processor Identification

7	6	5	4	3	2	1	0
CPU mode		P4M	Voltage ID, VID4–VID0				
RO	RO	RO	RO	RO	RO	RO	RO

I/O location: 066h
Index: 10
Default: N/A

CPU Mode Returns the state of the processor type selection jumper:

01 Pentium 4 or Celeron

10 Pentium 4-M

11 Auto select

P4M Pentium 4-M detected:

0 Pentium 4-M

1 Pentium 4 or Celeron

VID Processor voltage ID (selected by processor):

Returns the voltage identification value presented by the processor.

B.10 Controller Part Number

The controller part number format is 97-xxyy-0v where v is version number (top 4 bits of index register), xx is the byte 2 value and yy is the byte 1 value. BCD encoding is used for all digits.

Byte 1 is 36h

Byte 2 is 42h.

The programmed part number is 97-4236-0v for production motherboards.

Controller Part Number, low digits

7	6	5	4	3	2	1	0
Part number, byte 1							
RO	RO	RO	RO	RO	RO	RO	RO

I/O location: 066h
Index: 9
Default: N/A

Controller Part Number, high digits

7	6	5	4	3	2	1	0
Part number, byte 2							
RO	RO	RO	RO	RO	RO	RO	RO

I/O location: 066h
Index: 11
Default: N/A

C Connector Descriptions

Note 1: Connector views in the following sections are shown from the motherboard side.

Note 2: In all tables below the # sign indicates “active low.”

C.1 Connector Part Numbers

The various motherboard connectors are listed in the next table along with the part number of one of the approved vendors. The list is intended to assist in the selection of mating connectors.

Table 14. Connector part numbers

Connector	Part Number	Type
I/O panel dual USB	Foxconn UB1112C-8MD1	Dual vertically stacked USB
I/O panel 10/100 RJ45 over dual USB	Foxconn FM25U1B-21U5	RJ45 with LEDs and transformer over dual USB, 10/100
I/O panel Gbit RJ45 over dual USB	Foxconn FM38U1B-21U5	RJ45 with LEDs and transformer over dual USB, Gbit
I/O panel PS/2 keyboard and mouse	Foxconn MH11067-F7D2	Stacked 6-way mini-DIN
I/O panel VGA monitor (D-SUB 3 IN 1)	Foxconn DM11352-H5V3	15-way high-density female D-sub
I/O panel Serial port (D-SUB 3 IN 1)	Foxconn DM11352-H5V3	9-way male D-sub
I/O panel Parallel port (D-SUB 3 IN 1)	Foxconn DM11352-H5V3	25-way female D-sub
I/O panel double stack audio jacks	Foxconn JA2333L-HA6Q	Double vertically stacked 3.5mm
ATAPI CD-ROM Audio Line-In Header	NIKETECH 271S04-A01A	4-way header with latch, black
Keyboard and Mouse headers	Foxconn HF5504E	4-pin 2mm headers
ATAPI Audio Line-Out Header	NIKETECH 271S04-A08A	4-way header with latch, yellow
ATX12V Power Connector	Foxconn HM3502E-P1	2 by 2-way ATX power header
ATAPI Audio Microphone-In Header	NIKETECH 271S04-A07A	4-way header with latch, white
Processor Fan, System FAN1 and FAN2 Header	Foxconn HF0804E-M2	4-way with locking ramp
Processor Socket	Foxconn PE077527-1041	775-pin FC-LGA4
SMBUS Header	Foxconn HF5504E	4-pin 2mm header
x1 PCI-E Slot	Foxconn 2EG0181V-D2D	1 Lane differential pairs signaling
PCI Slot	Foxconn EH0600V-DAW	3.5V/5V signaling
ADD2 Slot (Green)	Foxconn 2EG0821V-D2G	8 Lane differential pairs signaling
USB Port 5,6,7,8 headers	NIKETECH 271S05-A01A	5-pin locking ATAPI-style, black
Remote Thermal Sensor Header	Foxconn HF5502E-N	2-pin 2mm header
Lithium cell holder	LOTES KB6666BP5L	Top loading, CR2032
DIMM Sockets	Foxconn AT2400V-H3B	240-pin, 1.8V DDR2 SDRAM
DIMM Sockets	Foxconn AT2400V-H3W	240-pin, 1.8V DDR2 SDRAM

Table 14. Connector part numbers

Connector	Part Number	Type
Front Panel Header	Foxconn HC11101-L6	2 by 10-way header
RS232 Serial Port2 Header	Foxconn HL20051-D1	2 by 5-way shrouded header
SATA Port 1 and Port 2 Header	Foxconn LD1807V-S51B	2 differential pairs signaling
TPM Header	Foxconn HL20101-P0	2 by 10-way header
ATX Power Connector	Foxconn HM3510E-P1	2 by 10/12-way ATX power header
GPIO Header	Foxconn HL20101-L7	2 by 10-way shrouded header
Diskette Connector	Foxconn HL20171-P4	34-pin shrouded header
Primary IDE Connector	Foxconn HL20201-UD2	40-pin shrouded header

C.2 PCI-E Expansion Slot (ADD2 card mode)

The PCI-E/ADD2 slot only supports 1.5V signaling.

Table 15. ADD2 Expansion Slot

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	+12V	B1	*Not Used*	A34	VDDQ1.5	B34	VDDQ1.5
A2	*Not Used*	B2	+5V	A35	DVOCD3	B35	DVOCD2
A3	*Not Used*	B3	+5V	A36	DVOCD1	B36	DVOCD0
A4	*Not Used*	B4	*Not Used*	A37	GND	B37	GND
A5	GND	B5	GND	A38	DVOCBLANK#	B38	DVOCHSYNC
A6	*Not Used*	B6	*Not Used*	A39	DVOCVSYNC	B39	*Not Used*
A7	*Not Used*	B7	*Not Used*	A40	VDDQ1.5	B40	VDDQ1.5
A8	*Not Used*	B8	*Not Used*	A41	MDVIDATA	B41	MI2CCLK
A9	+3.3V	B9	+3.3V	A42	*KEY*	B42	*KEY*
A10	*Not Used*	B10	*Not Used*	A43	*KEY*	B43	*KEY*
A11	*Not Used*	B11	*Not Used*	A44	*KEY*	B44	*KEY*
A12	*Not Used*	B12	*Not Used*	A45	*KEY*	B45	*KEY*
A13	GND	B13	GND	A46	MDVICLK	B46	MI2CDATA
A14	*Not Used*	B14	*Not Used*	A47	MDDCDATA	B47	VDDQ1.5
A15	ADDID1	B15	ADDID0	A48	*Not Used*	B48	*Not Used*
A16	+3.3V	B16	+3.3V	A49	GND	B49	GND
A17	ADDID3	B17	ADDID2	A50	ADDDETECT#	B50	*Not Used*
A18	*Not Used*	B18	*Not Used*	A51	MDDCCLK	B51	DVOBBLANK#
A19	GND	B19	GND	A52	VDDQ1.5	B52	VDDQ1.5
A20	ADDID5	B20	ADDID4	A53	DVOBCLKINT#	B53	DVOBFLDSTL
A21	ADDID7	B21	ADDID6	A54	DVOBD11	B54	DVOBD10
A22	*Not Used*	B22	*Not Used*	A55	GND	B55	GND
A23	GND	B23	GND	A56	DVOBD9	B56	DVOBD8
A24	*Not Used*	B24	+3.3VAUX	A57	DVOBD7	B57	DVOBD6
A25	+3.3V	B25	+3.3V	A58	VDDQ1.5	B58	VDDQ1.5
A26	DVOBCINTR#	B26	DVOCFLDSTL	A59	DVOBCLK#	B59	DVOBCLK

Table 15. ADD2 Expansion Slot

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A27	DVOCD11	B27	DVOCD10	A60	DVOBD5	B60	DVOBD4
A28	+3.3V	B28	+3.3V	A61	GND	B61	GND
A29	DVOCD9	B29	DVOCD8	A62	DVOBD3	B62	DVOBD2
A30	DVOCD7	B30	DVOCD6	A63	DVOBD1	B63	DVOBD0
A31	GND	B31	GND	A64	VDDQ1.5	B64	VDDQ1.5
A32	DVOCCLK#	B32	DVOCCLK	A65	DVOBHSYNC	B65	DVOBVSYNC
A33	DVOCD5	B33	DVOCD4	A66	VREFGC	B66	VREFGC

C.3 PCI Expansion Slot[12]

Table 16. PCI Expansion Slot

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	TRST#[13]	B1	-12V	A32	AD16	B32	AD17
A2	+12V	B2	TCK[13]	A33	+3.3V	B33	C/BE2#
A3	TMS[14]	B3	GND	A34	FRAME#	B34	GND
A4	TDI[14]	B4	TDO[15]	A35	GND	B35	IRDY#
A5	+5V	B5	+5V	A36	TRDY#	B36	+3.3V
A6	INTA#	B6	+5V	A37	GND	B37	DEVSEL#
A7	INTC#	B7	INTB#	A38	STOP#	B38	GND
A8	+5V	B8	INTD#	A39	+3.3V	B39	LOCK#
A9	CLKRUN#[15]	B9	PRSNT1#	A40	*Not Used*	B40	PERR#
A10	+5V	B10	*Reserved*	A41	*Not Used*	B41	+3.3V
A11	*Reserved*	B11	PRSNT2#	A42	GND	B42	SERR#
A12	GND	B12	GND	A43	PAR	B43	+3.3V
A13	GND	B13	GND	A44	AD15	B44	C/BE1#
A14	+3.3V AUX	B14	*Reserved*	A45	+3.3V	B45	AD14
A15	RST#	B15	GND	A46	AD13	B46	GND
A16	+5V	B16	CLK	A47	AD11	B47	AD12
A17	GNT#	B17	GND	A48	GND	B48	AD10
A18	GND	B18	REQ#	A49	AD9	B49	GND
A19	PME#	B19	+5V	A50	KEY	B50	KEY
A20	AD30	B20	AD31	A51	KEY	B51	KEY
A21	+3.3V	B21	AD29	A52	C/BE0#	B52	AD8
A22	AD28	B22	GND	A53	+3.3V	B53	AD7
A23	AD26	B23	AD27	A54	AD6	B54	+3.3V
A24	GND	B24	AD25	A55	AD4	B55	AD5
A25	AD24	B25	+3.3V	A56	GND	B56	AD3
A26	IDSEL	B26	C/BE3#	A57	AD2	B57	GND
A27	+3.3V	B27	AD23	A58	AD0	B58	AD1
A28	AD22	B28	GND	A59	+5V	B59	+5V
A29	AD20	B29	AD21	A60	REQ64#	B60	ACK64#
A30	GND	B30	AD19	A61	+5V	B61	+5V
A31	AD18	B31	+3.3V	A62	+5V	B62	+5V

[12] For ATX riser extension and slot 3 & 4 pin-out deviations, see following sections.

[13] Not used but pulled low
[14] Not used but pulled high to +5V
[15] Not connected

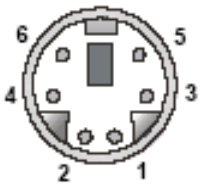
C.4 PCI Express x1 Slot

Table 17. PCI Express x1 Slot (PCI-E x1)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	PRSNT1# [16]	B1	12V	A10	3.3V	B10	3.3VAUX
A2	12V	B2	12V	A11	PWRGD	B11	WAKE#
A3	12V	B3	RSVD	A12	GND	B12	RSVD [16]
A4	GND	B4	GND	A13	REFCLK+	B13	GND
A5	JTAG2 [16]	B5	SMCLK	A14	REFCLK-	B14	HSOP0
A6	JTAG3 [16]	B6	SMDAT	A15	GND	B15	HSON0
A7	JTAG4 [16]	B7	GND	A16	HSIP0	B16	GND
A8	JTAG5 [16]	B8	3.3V	A17	HSIN0	B17	PRSNT2# [16]
A9	3.3V	B9	JTAG1 [16]	A18	GND	B18	GND

[16] Not connected

Table 18. P/S2 Mouse and P/S2 Keyboard



Pin	SIGNAL
1	Mouse DATA / Keyboard DATA
2	NC
3	GND
4	VCC
5	Mouse Clock / Keyboard Clock
6	NC

Table 19. Parallel Port

Pin	SIGNAL	Pin	SIGNAL
1	STROBE#	14	AUTO FEED#
2	DATA0	15	ERR#
3	DATA1	16	INIT#
4	DATA2	17	SLIN#
5	DATA3	18	GND
6	DATA4	19	GND
7	DATA5	20	GND
8	DATA6	21	GND
9	DATA7	22	GND
10	ACK#	23	GND
11	BUSY	24	GND
12	PE	25	GND
13	SELECT		

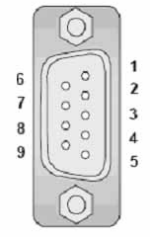


Table 20. Serial Port

Pin	SIGNAL	Pin	SIGNAL
1	DCD	6	DSR
2	SIN	7	RTS
3	SOUT	8	CTS
4	DTR	9	RI
5	GND		

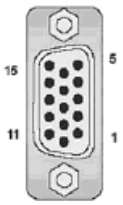


Table 21. VGA Port

Pin	SIGNAL	Pin	SIGNAL
1	RED	9	+5V
2	GREEN	10	GND
3	BLUE	11	NC
4	NC	12	SDA
5	GND	13	Horizontal Sync
6	GND	14	Vertical Sync
7	GND	15	SCL
8	GND		

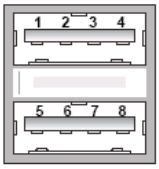


Table 22. 2 x Dual Stack USB Ports

Pin	SIGNAL	Pin	SIGNAL
1	VCC	5	VCC
2	DATA0-	6	DATA1-
3	DATA0+	7	DATA1+
4	GND	8	GND

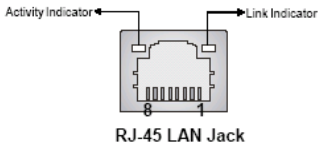


Table 23. LAN Jack

For 10/100Mbps			
Pin	**SIGNAL**	**Pin**	**SIGNAL**
1	TxD+	5	75R Terminator
2	TxD-	6	RxD-
3	RxD+	7	75R Terminator
4	75R Terminator	8	75R Terminator
For 10/100/1000Mbps			
Pin	**SIGNAL**	**Pin**	**SIGNAL**
1	A+	5	C-
2	A-	6	B-
3	B+	7	D+
4	C+	8	D-

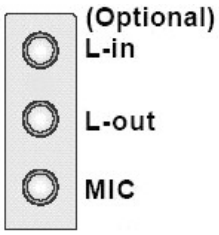


Table 24. 3 x Audio Jack

Pin	SIGNAL
Tip	Left Audio
Ring	Right Audio
Sleeve	GND
Remark	L- Line (Line In, Line Out)

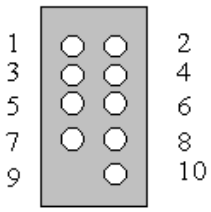


Table 25. 1394 Header

Pin	SIGNAL	Pin	SIGNAL
1	TA1+	6	TB1-
2	TA1-	7	Power
3	GND	8	Power
4	GND	9	KEY
5	TB1+	10	GND

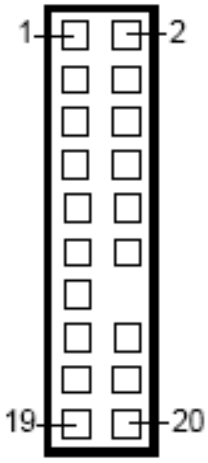


Table 26. Front Panel Header

Pin	SIGNAL	Pin	SIGNAL
1	HDLED+ (Anode)	2	GREEN LED+ and/or YELLOW LED-
3	HDLED- (Cathode)	4	GREEN LED- and/or YELLOW LED+
5	GND	6	PWRSW# (Reference to GND)
7	RESET# (Reference to GND)	8	GND
9	+5V (Fused)	10	+5V(fused, speaker power)
11	Not Used	12	SPKR# (Speaker return)
13	GND	14	KEY (no pin fitted)
15	GREEN LED+ and/or YELLOW LED- (same as pin 2)	16	SPKR# (Speaker return)
17	Not Used	18	TAMPER# (Reference to GND)
19	GREEN LED- and/or YELLOW LED+ (same as pin 4)	20	GND

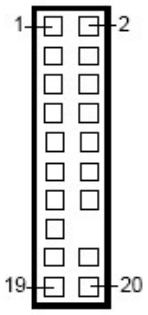


Table 27. General Purpose I/O Headers

Pin	SIGNAL	Pin	SIGNAL
1	GND	2	+5V (fused)
3	PWM	4	GPIO20
5	GPIO21	6	GPIO22
7	GPIO10	8	GPIO11
9	GPIO12	10	GPIO13
11	GPIO14	12	GPIO15
13	GPIO16	14	GPIO17
15	Reserved	16	KEY (no pin fitted)
17	GND	18	GPI23
19	GND	20	GPI24

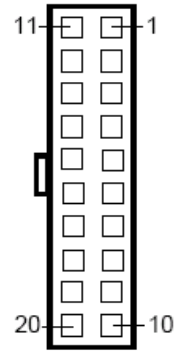


Table 28. Power Supply Connector

Pin	SIGNAL	Pin	SIGNAL
11	+3.3V	1	+3.3V
12	-12V	2	+3.3V
13	GND	3	GND
14	PSON#	4	+5V
15	GND	5	GND
16	GND	6	+5V
17	GND	7	GND
18	Not Used	8	PWROK
19	+5V	9	+5VSB
20	+5V	10	+12V

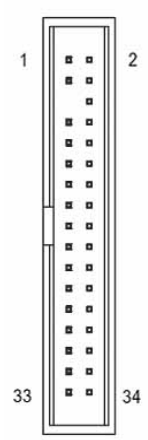
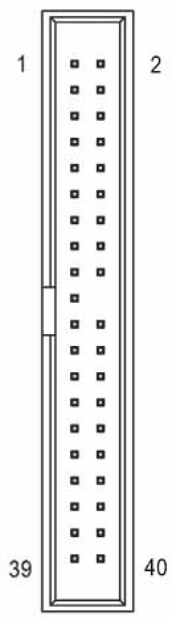


Table 29. Floppy Disk Connector

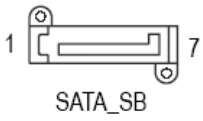
Pin	SIGNAL	Pin	SIGNAL
1	GND	2	DRVDEN0
3	NC	4	NC
5	KEY (no pin)	6	NC
7	GND	8	INDEX#
9	GND	10	MOA#
11	GND	12	DSB#
13	GND	14	DSA#
15	GND	16	MOB#
17	GND	18	DIP#
19	GND	20	STEP#
21	GND	22	WD#
23	GND	24	WE#
25	GND	26	TRAK0#
27	GND	28	WP#
29	GND	30	RDATA#
31	GND	32	HEAD#
33	GND	34	DSKCHG

Table 30. ATA/100 Hard Drive Disk Connector



Pin	SIGNAL	Pin	SIGNAL
1	HDRST#	2	GND
3	Device data 7	4	Device data 8
5	Device data 6	6	Device data 9
7	Device data 5	8	Device data 10
9	Device data 4	10	Device data 11
11	Device data 3	12	Device data 12
13	Device data 2	14	Device data 13
15	Device data 1	16	Device data 14
17	Device data 0	18	Device data 15
19	GND	20	KEY (no pin)
21	IDE REQ	22	GND
23	I/O WRITE	24	GND
25	I/O READ	26	GND
27	I/O RDY	28	Pull down for always master
29	IDE ACK	30	GND
31	IRQ14	32	NC
33	Device address 1	34	NC
35	Device address 0	36	Device address 2
37	Device chip select S1	38	Device chip select S3
39	HDDLED	40	GND

Table 31. SATA Disk Connector



Pin	SIGNAL
1	GND
2	A+ transmit
3	A- transmit
4	GND
5	B-receive
6	B+ receive
7	GND

Table 32. 3X Internal Audio Headers

Pin	SIGNAL
1	LEFT
2	GND
3	GND
4	RIGHT

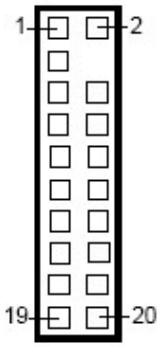


Table 33. TPM Header

Pin	SIGNAL	Pin	SIGNAL
1	LCLK	2	GND
3	LFRAME#	4	KEY PIN
5	LRESET#	6	NC3
7	LAD3	8	LAD2
9	VDD	10	LAD1
11	LAD0	12	GND
13	NC1	14	NC4
15	NC2	16	SERIRQ
17	GND	18	CLKRUNin
19	LPCPDn	20	NC5

Table 34. Complex Programmable Logic Device (CPLD) JTAG Header

Pin	SIGNAL
1	VCC_STBY
2	CPLD_TDO
3	CPLD_TDI
4	NC
5	KEY PIN
6	CPLD_TMS
7	GND
8	CPLD_TCK

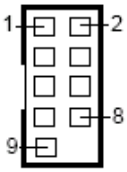


Table 35. Serial Port 2 Header

Pin	SIGNAL	Pin	SIGNAL
1	DCD	2	DSR
3	RxD	4	RTS
5	TxD	6	CTS
7	DTR	8	RING
9	GND	10	KEY

Table 36. 4 X Internal USB Headers

Pin	SIGNAL
1	+5V (fused)
2	DATA-
3	DATA+
4	GND
5	GND

Table 37. Remote Thermal Sensor

Pin	SIGNAL
1	DIODE+
2	DIODE-

Table 38. 3 X Fan Connector

Pin	SIGNAL
1	GND
2	+12V
3	TACHO
4	PWM

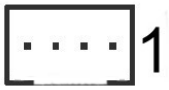


Table 39. SMBus Connector

Pin	SIGNAL
1	+3.3V
2	DATA
3	CLOCK
4	GND

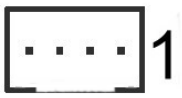


Table 40. PS/2 Keyboard Header

Pin	SIGNAL
1	+5V (fused)
2	DATA
3	GND
4	CLOCK

Table 41. PS/2 Mouse Header

Pin	SIGNAL
1	+5V (fused)
2	DATA
3	GND
4	CLOCK